

THE CONDOR

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May-June, 1917

Number 3



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THE HOME LIFE OF THE BAIRD SANDPIPER

By JOSEPH DIXON

WITH MAP AND FIVE PHOTOS

THE BAIRD Sandpiper (*Pisobia bairdi*) is certainly an "extremist" in its conception of the proper places at which to spend the different seasons of the year, for it breeds entirely within the Arctic Circle, and passes the winter in southern South America. In the United States it occurs merely as a passing migrant in spring and fall. The present author became acquainted with the species in its summer home during the seasons of 1913 and 1914, which he spent in the heart of its summer habitat, on the two hundred mile stretch of Arctic coast extending westward from the mouth of the Mackenzie River. Notes and photographs secured at that time are used in the following account of the bird; for permission to use this material the writer is indebted to Mr. John E. Thayer, who met the cost of the field work whereby it was obtained. He is further indebted to Mr. Thayer and to Mr. Samuel Henshaw, Curator of the Museum of Comparative Zoology, for the photographs of the two sets of eggs (figs. 27 and 28). These specimens, taken upon this same expedition, are now in the collection of the above named institution.

Specimens of the Baird Sandpiper have been taken in winter at 13,000 feet elevation in the mountains of northern Chile, in Argentina, and in Patagonia. It is said to remain in its winter home until the last of March (Cooke, Biol. Surv., Bull. 35, 1910, p. 39). When it starts on its northward journey to the shore of the Polar Sea the route followed in traversing northern South America appears to be unknown, for the species is practically lost sight of until its arrival on the Gulf coast of Texas. Here it has been reported as of common occurrence from early in March to the middle of May.

The main migration route to the breeding ground may be said to lie between the eastern foothills of the Rocky Mountains and the Mississippi River. There are comparatively few spring records from the Pacific Coast of North America,

and these mostly from southern stations. From southeastern Alaska there are but two or three. The Baird Sandpiper seems to be practically unknown east of the Mississippi during the spring migration. At points farther north large flocks foraging on masses of floating ice were noted by Preble at Lake Athabasca, Canada, May 25, 1901 (N. Am. Fauna, no. 27, 1908, p. 321); and Grinnell (Pac. Coast Avif., 1, 1900, p. 23) records a female from Kowak River, Alaska, May 20, 1899.

The species arrives at its breeding grounds in the Arctic during the last week in May. Brooks noted the first arrival at Demarcation Point, on the Alaska-Canada boundary, on the Arctic Coast, on May 23, 1914, while the average date of arrival for three years at Point Barrow was May 29. At Griffin Point, Arctic Alaska, the first birds were noted May 31, 1914. Dr. R. M. Anderson



Fig. 26. MAP SHOWING BREEDING STATIONS OF BAIRD SANDPIPER, ALONG ARCTIC SHORES OF SIBERIA AND NORTH AMERICA. THE YEARS INDICATED ARE THOSE WHEN OBSERVATIONS WERE MADE.

took a specimen at Collinson Point, Arctic Alaska, on May 31, 1914.

According to the A. O. U. Check-List (1910, p. 114) the Baird Sandpiper "Breeds along the Arctic Coast from Point Barrow to Northern Keewatin". The most eastern record that I have been able to find is that of Collinson (1853) at Cambridge Bay on Victoria Island, Franklin. However, recent evidence indicates that the breeding range of this species is not entirely restricted to the western hemisphere, as had been supposed. (See fig. 26.)

On June 11, 1913, an adult male Baird Sandpiper was secured by our party at the head of Providence Bay, East Siberia (Brooks, Bull. Mus. Comp. Zool., LIX, 1915, p. 385). John Koren (Warbler, xi, 1910, p. 10) states: "On July 3 [1909] I found a nest of Baird Sandpiper on the high, stony plateau on the south end of the island [Koliuchin Island, northeast Siberia], the eggs about five days incubated". Thus it appears that the species also breeds along the coast of north-

east Siberia, where conditions are similar to those of the nesting ground in northernmost North America. There seems to be no instance of the Baird Sandpiper nesting south of the Barren Grounds of the Arctic Coast.

Dr. R. M. Anderson (in Stefansson's "My Life with the Eskimo", 1913, p. 472) says that this species "nests somewhat locally, usually on dry ground near the coast". He also points out that it may be absent at a certain point and abundant only a few miles away. The present author also noted this tendency of the species to breed in comparative abundance at one particular place, while it might be entirely absent at a similar, and as far as could be seen, equally suitable, place only a few miles distant. This bird was found to be the commonest breeding sandpiper at Herschel Island, Yukon, where an officer of the Northwest Mounted Police informed me that several nests had been found on the dry tundra in late June.

Upon our arrival at Herschel Island on July 28, 1914, between thirty and forty young Baird Sandpipers were noted daily in a series of shallow tide pools adjoining the "Barracks". Some of these were scarcely able to fly, in fact the Eskimo boys ran one down, so these birds could not have flown across the channel from the adjoining mainland, where the species was rare or absent at this date.

Unlike the Longspurs and some other birds, the male and female Baird Sandpiper arrive at the breeding grounds together. They were notable among the shore birds on account of their nervous demeanor and retiring nature. Another good field character is found in the long wings and legs, combined with a relatively slender body, which makes the birds appear much larger than they really are, especially in comparison with the wee Semipalmated Sandpiper, with which they are most often associated. As a rule the Baird Sandpiper is a retiring personage, preferring his own or his mate's company to that of other birds.

On May 31, 1914, at Griffin Point, Arctic Alaska, the first pair of Baird Sandpipers for the season were noted feeding along the rim of a frozen tundra pond. The weather had turned bitterly cold during the previous night, and as a result the newly formed ice on the ponds was thick enough to support a man. Strictly speaking, there was no night at this date, for the two months of continuous daylight had already begun; so in a short time the sandpipers were bustling about picking up the mosquito and other pupae which were being washed out by a newly-born stream that gurgled under the snow and ice on its way down to the frozen lagoon.

The Longspurs and Semipalmated Sandpipers waded boldly along the margins of the shallower pools when feeding, but the Baird Sandpipers seemed to be more dainty, and at this time were not observed to wade to the extent that the other birds did. They apparently preferred to hunt their food along the edges of pools with banks sufficiently abrupt so that from the shore they could pick up floating pupae and other dainties and still keep their feet dry.

The courtship of the Baird Sandpiper appears to be carried on in absolute silence. This is in marked contrast to the ventriloquial hooting of the male Pectoral Sandpiper, or the cricket-like song and peculiar nuptial flight of the Semipalmated Sandpiper. Brooks (loc. cit.) has aptly described the courtship of the Baird Sandpiper as follows: "Only once did I note any courtship activity. On this occasion (May 24), the male would fly a few feet above the female, while she rested on the ground, with quick erratic wing strokes suggesting a Nighthawk. Frequently he would alight and raise the wings high over the back as a gull does before folding them. Then with the forearms perpendicular, the primaries

would be slowly raised and lowered like a pump handle, generally lowered to right angles with the forearms, sometimes lower. Not a sound was uttered." On May 31 the present author witnessed a similar silent courtship at Griffin Point, Alaska.

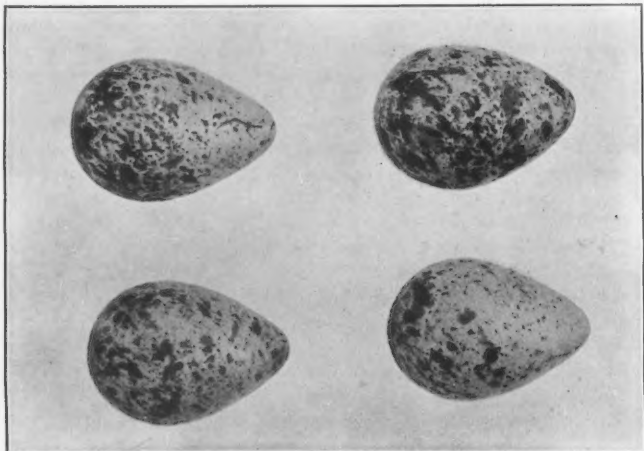


Fig. 27. EGGS OF THE BAIRD SANDPIPER, NATURAL SIZE. SET SECURED BY W. S. BROOKS AT DEMARCATION POINT, ALASKA, JUNE 12, 1914.

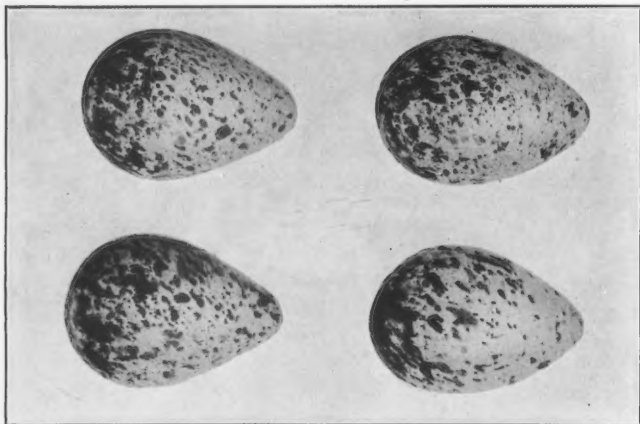


Fig. 28. EGGS OF THE BAIRD SANDPIPER, NATURAL SIZE. SET SECURED BY W. S. BROOKS AT DEMARCATION POINT, ALASKA, JUNE 14, 1914.

All of the nests of the Baird Sandpiper which I have examined were near the coast and placed on dry, well drained tundra, away from the immediate vicinity of ponds. Murdock, at Point Barrow, Brooks, at Demarcation Point, and Anderson at various points along the Arctic Coast, have all noted this same nesting

preference. MacFarlane (Proc. U. S. Nat. Mus., xiv, 1891, p. 426), however, states: "On 24th June, 1864, a nest containing four eggs was found in the Barren Grounds in a swampy tract between two small lakes, and was composed of a few decayed leaves, placed in a small cavity or depression in the ground, shaded by a tuft of grass."

Murdock (Rept. Exp. Pt. Barrow, 1885, p. 112) says: "The nest was always well hidden in the grass, and never placed in marshy ground or on the bare black patches of tundra, and consists merely of a slight depression in the ground thinly lined with dried grass. All the eggs we found were obtained from the last week in June to the first week in July, a trifle later than the other waders."

Brooks (loc. cit.) remarks: "Two nests were found, each containing four eggs and about one quarter incubated on June 12 and 14, 1914. Murdock found them nesting rather later than other waders at Point Barrow, but my experience at Demarcation Point was quite the opposite, for here they were the first to breed. A female taken June 2, had a fully formed and colored egg about ready to lay. Both of the above nests were like the other sandpipers, and lined with dry willow leaves, but the cavities were less deep than those of the Semipalmated Sandpiper."

At Griffin Point, less than fifty miles to the eastward of Demarcation Point, the first set of eggs (fresh) was taken on June 24. The last set was found July 11, with the four eggs nearly ready to hatch. Murdock speaks of the nests being well concealed and always hidden in the grass. In those nests which we found, no attempt had been made at such concealment, as they were placed absolutely in the open, with nothing to cover or conceal the eggs at all, and the nests so shallow that the tops of the eggs were almost or quite level with the surrounding grass. Far from being conspicuously exposed thereby, however, the eggs were shielded from discovery in the most effective manner possible, for in color and markings they blended so perfectly with the brown tundra that a person could easily look directly at them from a distance of six feet and still not be able to see them.

This method of nesting seems to be the most effective way of escaping one great danger at least, namely, the notice of the countless Jaegers, both Parasitic and Pomarine. These robbers subsist almost entirely during the breeding period on the young and eggs of other birds, and cruise continually back and forth over the sandpipers' nesting ground, looking for the least telltale feather, bit of wind-blown down, or other object which might afford a clue to the whereabouts of a nest.

On June 26 I found a nest of the Baird Sandpiper by nearly stepping on the bird. It contained three fresh eggs, and was in the usual exposed position on the tundra, there being only the slightest of depressions lined with dead willow leaves which were also well strewn over the tundra in general at this particular point. I marked the nest by placing a fresh chunk of turf on a little mound about ten feet to one side. Upon taking my departure I noticed a Pomarine Jaeger following in my wake, and as I looked back the bird spied the upturned clod and promptly lit and began to walk around on the ground to see the cause of the disturbance. It is perhaps needless to add that the three eggs were gone when I returned. I found that the only way to mark down a nest was by placing two guides in a line, keeping them at least fifty yards away from the nest site.

All of the complete sets of eggs which have come under my notice have con-

sisted of four eggs. The three eggs referred to above were fresh, and the set probably incomplete.

In those pairs which I have observed the male bird was found covering the eggs more often than the female, so I believe that it is safe to say that the male does at least half of the incubating. The birds are very nervous and extremely wary when once they have been flushed from the nest. They usually "sit tight" the first time, however, and do not flush unless nearly stepped upon.

On June 25 a male bird was flushed from a nest at a distance of less than six feet. I had been told the general location of the nest, hence was carefully examining the tundra as I walked slowly along, yet I was unable to see the bird, flattened out as he was, and doubtless would have passed directly over him had he not darted from under my feet. Desiring a photograph of the brooding bird I set up the camera a few inches off the ground, and four feet from the nest, covering it completely with brown tundra moss. I then hid in a slight depression

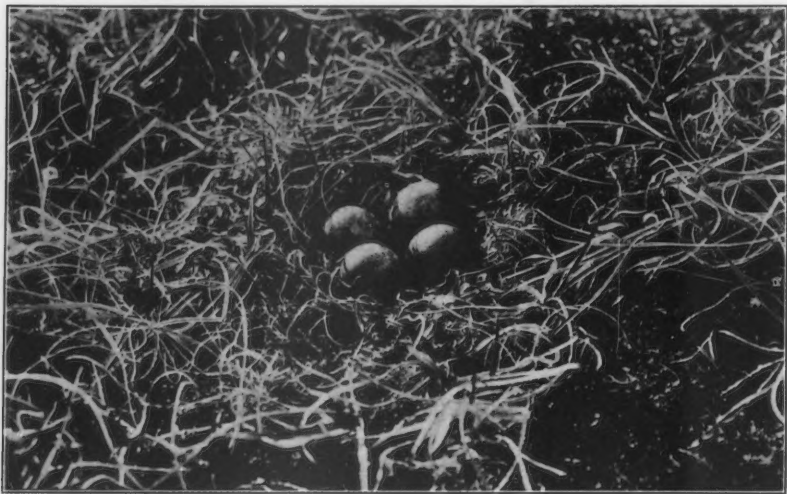


Fig. 29. NEST OF BAIRD SANDPIPER ON DRY TUNDRA NEAR GRIFFIN POINT, ARCTIC ALASKA, JULY 11, 1914.

about thirty yards away, and awaited the return of the bird.

Instead of returning directly to the nest the bird first flew about in wide circles. Then, having satisfied himself that no active danger threatened, he lit about twenty yards away and began to run in circles about the nest, gradually approaching nearer and nearer. He stopped every few yards, and remaining motionless, blended into the landscape so effectively that I was quite unable to distinguish him unless I had had my eyes directly upon him when he stopped. During these stationary periods a low whining bark was heard, of which he appeared to be the author, for the sound always came from where the bird stood, and moved about as he moved. No other bird put in an appearance. The male finally went onto the nest, but bolted wildly at the click of the shutter. He would not return at all after being flushed a second time.

On July 11 another nest was located, on a barren ridge close to a large snow

bank. In this case the bird fluttered off, simulating a broken wing and uttering cries of distress. We were some twenty-five yards distant when he flushed, and had considerable difficulty in finding the nest. It contained the usual four eggs, so badly incubated that there seemed little hope of saving them, and in every respect was typical of the species. The photo (fig. 29) was taken about nine o'clock in the evening. Unfortunately the slanting rays of the sun glinted from the upper surface of the eggs, obscuring the markings, which were unusually bold in this set. Both female and male came about and inspected the camera, while we hid behind a snowbank trying to keep warm by fighting mosquitos. It was over half an hour before the male returned to the nest, and then he insisted upon facing the camera, which is a trait typical of all sandpipers that I have tried to photograph on their nests (fig. 30).

We did not secure any Baird Sandpipers in natal down, as apparently we



Fig. 30. SAME NEST AS IS SHOWN IN FIG. 29; NEAR GRIFFIN POINT, ARCTIC ALASKA, JULY 11, 1914. MALE BAIRD SANDPIPER BROODING.

left too soon, going aboard the ship leaving winter quarters on July 16. We did not again meet with the species until reaching Herschel Island on July 28. Dr. Anderson, however, took downy young at Collinson Point on July 11.

In the report of the Mellhenny Expedition to Point Barrow, Stone states: "Ten young in the down were taken July 16, 18 and 27; they are darker than young Dunlins, with the brown tints darker and not so rufous, while the light mottlings are whiter and less tinged with buff. Two others taken August 1 are intermediate between the down and first winter plumage" (Proc. Acad. Nat. Sci. Phila., 1900, p. 26).

A young Baird Sandpiper taken at Herschel Island, Yukon, July 30, has the natal down still plainly visible on the back and top of the head (fig. 31); the whitish tips of the feathers on the back are much in evidence. These white edg-

ings on the dark feathers were very much in accord with the general black and white color scheme of the gravel bar upon which the bird had squatted, endeavoring to escape notice by remaining motionless. The change from natal down to the immature plumage is well illustrated in this individual.

The young sandpipers were found feeding in the shallower pools, where the water was less than one inch deep. At times as many as five were noted in an area one yard square. They congregated along the water's edge, picking up, as the tide slowly receded, many bits of food. The nature of this provender I could not make out although the young birds would often come within twenty feet of me when I remained motionless for a few minutes. The old birds were much more shy, often taking flight or retreating to distant gravel bars upon my approach. Considerable time was spent by both young and old in making short flights about the harbor. These flights alternated with periods of food getting, and were seemingly in preparation for the fall migration. It was only a few days then until the bulk of the species left on their southward journey.



Fig. 31. IMMATURE BAIRD SANDPIPER HIDING ON GRAVEL BAR. HERSCHEL ISLAND, YUKON, JULY 30, 1914.

Murdock reports the last bird seen at Point Barrow on August 12. In 1913 we noted the last of the species on August 11, near Barter Island, Arctic Alaska; in 1914 I saw none after August 15. There is no apparent reason for the sandpipers leaving their summer home as early as they do, as the weather is very much more genial at this time than it is during the breeding season, and the food supply is certainly as abundant.

The main body of Baird Sandpipers return south by the spring migration route, between the Mississippi and the Rockies, but there is a tendency to spread out along both the Atlantic and Pacific sea coasts. Swarth (Univ. Calif. Publ. Zool., vii, 1910, p. 51) noted the first fall migrant at Thomas Bay, in southeastern Alaska on August 15, 1909, and the birds were common a week later. The species has been considered rare on the Atlantic coast in fall, but recent observations have produced numerous records until it seems now that the bird must be more common there than it was believed to be. The birds reach their winter home in southern South America in September.

Museum of Vertebrate Zoology, University of California, March 14, 1917.

WILD DUCKS IN A CITY PARK

By W. W. RICHARDS

WITH FOUR PHOTOS BY THE AUTHOR

VENICE has her pigeons, which, feeding in swarms in her streets and squares, form a feature of the city that has become famous the world over, but after all, these are domestic birds that have made no great change in their habits. In the city of Oakland, California, there is to be seen a comparable sight of greater marvel, in the wild ducks that flock upon Lake Merritt during the winter months. In what other community are there to be found wild birds of such notable wariness and timidity finding sanctuary within five minutes walk of the City

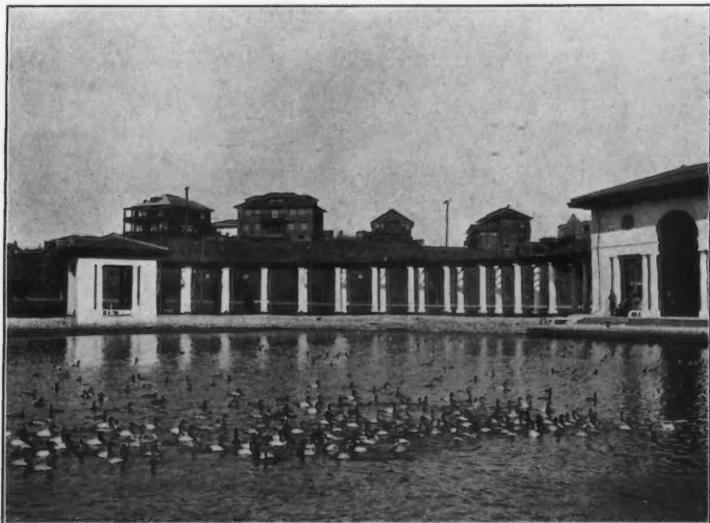


Fig. 32. WILD DUCKS UPON LAKE MERRITT. THE CANVAS-BACKS, PREFERRING DEEP WATER, DO NOT VENTURE OUT UPON THE LAWNS.

Hall and business center, and this in a city of one hundred and fifty thousand inhabitants?

The accompanying photographs were taken at Lake Merritt during the past winter (1916-17). At the northern end of the lake a stretch of water about a mile in length has been fenced off, so as to prevent the approach of pleasure boats. Here the ducks congregated by the thousand, resting upon the water or feeding upon the surrounding lawns, a sight that attracted scores of visitors. The birds soon realized their immunity from the dangers by which they were usually beset, and lost all fear of the surrounding throngs.

In the photos taken upon the lawns (figs. 33, 34, 35) the species that predominate are the Sprig (*Dafila acuta*) and Baldpate (*Mareca americana*), with, of course, the ever-present Mudhen (*Fulica americana*) conspicuously in the



Fig. 33. SPRIG, BALDPATE AND COOTS FEEDING ON THE LAWN.



Fig. 34. SAME FLOCK AS IN FIG. 33. SOME OF THE MORE TIMID ARE BEGINNING TO LEAVE AT THE PHOTOGRAPHER'S APPROACH.

foreground. The flock resting upon the water is composed mainly of Canvasbacks (*Marila valisineria*), a deep water species that feeds but little upon land.

These birds arrive about October of each year. After the close of the shooting season they begin to scatter, for, with general protection elsewhere there is no longer need of congregation within this sanctuary; so that the ducks cease to be a conspicuous feature of Lake Merritt some time before their departure for distant breeding grounds.

Oakland, California, February 14, 1917.



Fig. 35. SAME FLOCK AS IN FIGS. 33 AND 34. THERE IS A LIMIT TO THE TRUSTFULNESS OF EVEN VERY TAME WILD DUCKS AND PHEGMATIC MUDHENS.

SOME FACTORS INVOLVED IN THE NESTING HABIT OF BIRDS

By CLARENCE HAMILTON KENNEDY

WITH TWELVE DRAWINGS BY THE AUTHOR

ONE OF the most interesting series of problems in ornithology is that connected with the high development of the nesting habit in birds. But little has been done to correlate bird anatomy and nesting habits, or even to figure out the causes leading to the great diversity of nests which birds build, for when the present writer wished to look up some obscure points on the nesting habits in this group, great was his surprise that in a group so thoroughly worked, so little had been done in the study of nidification other than the mere collection of data on the nesting habits of individual species. No group in the animal kingdom has been so thoroughly worked as that of the birds, yet the attempts to fig-

ure out the biological reasons for the various developments in nidification are comprised in a few pages of printed matter. A. R. Wallace has given an interesting theory of the relation of the nest to the coloration of the species building it, in his "Theory of Birds' Nests" (Journal of Travel and Natural History, 1868). This has been discussed and criticised by Dr. J. A. Allen, in the Bulletin of The Nuttall Ornithological Club. A few limited and cursory discussions of various phases of the subject are given in various general works such as Knowlton's "Birds of the World", but no extended study of the subject has been made.

Just why the individuals of one generation of a given species in the animal kingdom should occupy themselves in any manner with the rearing of the succeeding generations is a philosophical-enigma, for after the production and fertilization of the egg no physical necessity of their own is satisfied by it. Nevertheless we find the beginnings of such care even among the lowest animals.

Nidification first appears in the vertebrates among the aquatic forms, for among fishes the little stickleback and the pugnacious sunfish guard their nests with great fearlessness, while the humble bullhead, after the eggs are hatched, may be seen leading his dusky young about as they learn the business of fish life. Fish nests are usually very simple affairs, being seldom more than shallow basins in the stream bottom, but when we get among the higher vertebrates we find more ambitious structures. For among all vertebrates the nest has reached its most elaborate development with man, though in the other great group of warm-blooded vertebrates, the birds, it has reached a development in which many nests show a wonderful ingenuity and exquisite care in construction.

The nesting habit among birds is probably anticipated by the nesting habits which are found among reptiles, as from the ancient reptilian group of Dinosaurs have probably arisen our modern birds. The nesting habits of the higher modern reptiles and some of the more primitive birds are so similar that they can be said to bridge over the gap from the slovenly nidification of the average indifferent reptile to that solicitous care of the young characteristic of the highest birds. Many of the modern snakes deposit their eggs in holes in the ground or in the soft wood of rotten stumps, and turtles dig jug-like holes in the sand. Some tropical alligators deposit their eggs in warm sandbanks, while those found in the cooler latitude of the southern states bring together a mass of rotting vegetation, by the warmth of which the eggs are hatched, after which the young are guarded for a time by the mother. Now this method of nesting occurs among some of the lower birds, though here it is a reversion from, or more probably a special development of, the general bird type. The interesting fowls which have this primitive nesting habit are the Megapodes of the Australian region. Of these, the Australian Brush Turkey (*Catharturus lathami*) rakes together a pile of decaying leaves and rotten wood, and in this mound at intervals deposits its eggs, which are incubated by the heat from the decomposition of the nest materials. Other members of this same curious group deposit their eggs in the warm sands of the sea shore, where they are left without further care.

Similar to this were probably the beginnings of the nesting habit among birds. Careful guarding of the eggs early developed into a definite period of incubation, which was made possible by the high temperature of the body. The development of the four-chambered heart meant the possibility of the great development of the brain, as this delicate organ was no longer poisoned by quantities of venous blood; then, with this increase in brain power, could come the dexterity and ingenuity displayed by the average bird in constructing his home.

We may add to the above factors some others, and discuss the series as follows:

1. Perhaps the first factor leading toward the care of eggs by the oviparous vertebrates is the reduction of the number of eggs in a clutch and the increase in the amount of yolk and food materials. This reduction in number, from the hundreds or thousands of eggs laid by the lower vertebrates to the few laid by the average reptile or bird, makes possible better care for the few. This decrease in number and increase in care already appears in the fishes. Here, however, the problem is complicated by the factors of environment, for the highly specialized pelagic mackerels strew their thousands of eggs uncared for on the surface of the sea, while the more primitive catfishes, using the opportunities afforded them by the stream beds, guard jealously in a nest the few hundred eggs they produce each season.

The vertebrate egg, denuded of food and protective envelopes, is a single cell, which in the chicken is but one twentieth of a millimeter in diameter. As such these cells occur in the ovary of the fowl. In the later development food in the form of yolk is added inside this cell until it may become more than an inch in diameter, then, during its passage down the oviduct, there are wrapped about it the nutritive envelopes of albumen and the fibrous and calcareous envelopes, which we know as the egg-shell. Fig. 36a shows the later development of the egg in the ovary, where yolk is being added to it, and the arrangement of the oviduct in which those parts other than the yolk are added. Fig. 36b shows a hen's egg in section in which the eye of the yolk is the only living part.

2. Immediately associated with this increase in the amount of yolk material and the addition of the nutritive albumen is the development, first, of the fibrous, and then of the calcareous, shell. This hard shell was probably necessitated by the change of the reptilian ancestors from a semi-aquatic to a purely terrestrial environment, for the eggs then required such an impervious shell to protect them from desiccation. As the results of a change are seldom simple, we find that the hard shell made possible more elaborate nests, and these placed in a greater variety of situations, as the developing embryo was then protected from mechanical injuries as well as from drying.

3. One of the greatest steps in advance towards avian nidification was the increase and stabilization of the body temperature. This probably occurred slowly as the birds became more and more differentiated from the reptiles. Indications of this slow increase still remain, as in *Apteryx* and others of the lowest

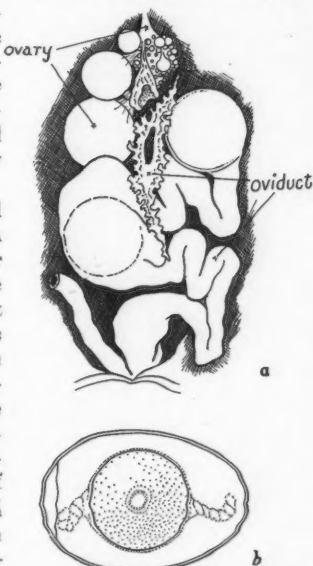


FIG. 36. a. OVARY AND OVIDUCT IN THE CHICKEN, SHOWING THE EGGS OF THE OVARY EACH IN ITS FOLLICULAR SAC WHERE IT IS ACQUIRING YOLK. BELOW THE OVARY THE GLANDULAR OVIDUCT, WHICH, WHILE THE EGG PASSES THROUGH IT, SECRETES AROUND THE EGG THE WHITE AND THE SHELL. b. DIAGRAM OF A HEN'S EGG IN WHICH THE "EYE" OF THE YOLK IS THE INCIPIENT EMBRYO, THE ONLY LIVING PART OF THE EGG.

living birds the body temperature is at an average of from 5 to 10 degrees lower than in the more highly specialized forms such as our songbirds, where it may reach 111 degrees F. With this increase in temperature the guarding of the nest by the parents became more and more a definite act of incubation in which the heat was furnished by the body of the parent. Thus the hatching was speeded up and removed from the uncertainties of weather or the irregularities of decomposing vegetable matter. It is interesting to note at this point that the Megapodes, which leave their eggs to be incubated by the warm sand or by decaying vegetable matter, of which group I have already mentioned the Australian Brush Turkey, nearly all occupy islands in the Australian region where there are few or no small predaceous mammals. This style of nesting would be of little protection against such enemies, for the mounds are conspicuous, the eggs are relatively large, and incubation is slow. The heat is low and the young have to be advanced enough at hatching to burrow out of the sand or mass of debris and

hustle a living for themselves at once. We might speculate that this simple form of nesting and those birds that practiced it have been eliminated in other parts of the world by some such enemy.

4. A corollary to this increase in body temperature is the development of the reptilian scales as a whole or in part into the delicate fimbriated scales of birds which we know as feathers. These made a high body heat possible, and made the heat for incubation more reliable, as they helped cover the eggs. Incidentally they made flight possible in this group, and with flight the high development of arboreal nests so characteristic of the more specialized forms. Birds were probably evolved from the bipedal Dinosaurs and came into existence without that ability to climb which is the birthright of the small quadrupeds, where the possession of both fore and hind feet in a generalized form mechanically fits the owner for an arboreal life. Instead birds probably hopped awkwardly from limb to limb, flight at first being merely a lengthening of such leaps. The scansorial birds, such as woodpeckers, creepers, nuthatches, certain parrots and others, are highly specialized groups in which the climbing habit has been only recently redeveloped.

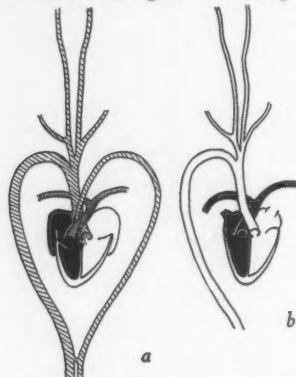


Fig. 37. *a.* CIRCULATORY SYSTEM IN THE ANTERIOR END OF A REPTILE, WITH THE MIXED VENOUS AND ARTERIAL BLOOD BATHING THE BRAIN. *b.* CIRCULATORY SYSTEM IN THE ANTERIOR END OF A BIRD, IN WHICH ONLY FRESH ARTERIAL BLOOD REACHES THE BRAIN.

wardly from limb to limb, flight at first being merely a lengthening of such leaps. The scansorial birds, such as woodpeckers, creepers, nuthatches, certain parrots and others, are highly specialized groups in which the climbing habit has been only recently redeveloped.

The preceding factors are especially associated with the actual incubation of the eggs. The succeeding are more immediately associated with the art of nest building itself.

5. Coming at this same time of transition, when the birds were differentiated from their reptilian ancestors, was the change in the heart from a three-chambered to a perfect four-chambered organ. Thus in the anterior end of the body were the venous and arterial bloods entirely separated. This great advance in the circulatory system meant that only the freshest and purest blood went to the brain, the delicate cells of this organ being stimulated and nourished by the

pure arterial blood, by which change was brought about the wonderful development of the brain in the warm-blooded vertebrates. With development of the brain could come the cleverness necessary to the building of the average bird nest. Fig. 37*a* shows the circulatory system in the anterior end of a reptile (crocodile), with the mixed venous and arterial blood bathing the brain, while in fig. 37*b* is shown the circulatory system in the anterior end of the bird, where only fresh arterial blood reaches the brain. Fig. 38 shows the difference in the development of the brain in the alligator (*a*) and in the bird (*b*). The main differences are the greater development of the cerebral hemispheres and the cerebellum in the bird. In the cerebral hemispheres are located all those centers which give to birds that greater intelligence which separates them at once from existing reptiles, while in the cerebellum are probably located those stores of great energy and centers of coördination that give the birds their intense activity and great cleverness.

6. As the anterior limbs of birds are highly specialized for flight, they must use for their actual nest building tools the mouth or the hind limbs. Many birds use both, though the bill is used most often, for the hind limbs are usually too highly specialized in their own way to admit of much use in nest building. In the use of the bill as a building tool lies the birds' one great handicap in ever developing nest building beyond what we see today. The great awkwardness that comes from having the eyes, which must gauge and judge the work, on the very base of the tool itself, will make impossible a much higher development of this art among birds. The most efficient tools are those such as the human hand, where the judging eye is undisturbed by the motions of the tool itself, and where the eye can, as it were, remain aloof and attend exclusively to the business of overseeing. In many groups of the animal kingdom correlations between the tools used and the work performed are very close, but in birds, adaptation of the bill to the work of nest building is only a secondary use for this organ, the main duty of which is that of food getting. Fig. 39 shows two bills, of the Bank Swallow (*a*) and of the Belted Kingfisher (*b*), which, while almost as dissimilar as any two bird bills can be, yet are used in constructing similar burrows in earth

banks. The key to this difference lies in the adaptation of the two bills to the kinds of food used. The short and frail swallow bill is used to scoop up delicate insects on the wing, while that of the kingfisher is for seizing fish in the water.

7. The remaining factors in the development of the bird into a nest building animal, are those connected with the perfection of the bill as a nest building tool. Several minor developments may be grouped under this head,

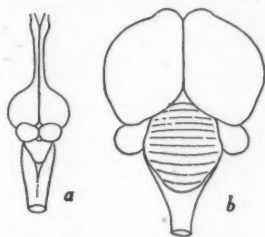


Fig. 38. *a*. BRAIN OF THE ALLIGATOR SHOWING THE SMALL CEREBRAL HEMISPHERES AND SMALL CEREBELLUM. *b*. BRAIN OF THE GOLDEN EAGLE, SHOWING THE LARGE CEREBRAL HEMISPHERES AND CEREBELLUM.

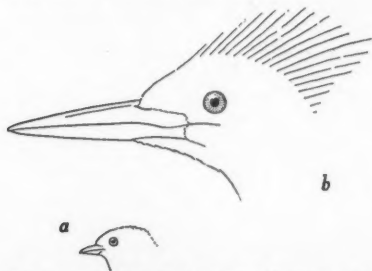


Fig. 39. *a*. HEAD OF A BANK SWALLOW. *b*. HEAD OF A KINGFISHER.

of which the most important are those anatomical peculiarities, which give the bird a long and flexible neck. In birds there are generally more neck vertebrae than among many other vertebrates, and these are longer than usual and have remarkably flexible joints. Fig. 40 shows the



Fig. 40. NECK VERTEBRA OF CROW SHOWING THE SADDLE-SHAPED ARTICULATION.

articulatory surfaces of a crow's vertebra. These do not form a ball and socket joint, which theoretically would be the most flexible possible articulation, but each is convex in one direction and concave, or saddle-shaped, in the other. Several such joints in series make a neck as flexible as a similar number of ball and socket joints.

Next to the flexibility of the neck as a factor in increasing the usefulness of the bill, is the rather flexible articulation of the mandible itself. In reptiles and birds an extra bone, the quadrate, is inserted between the articulatory tip of the mandibular ramus and the base of the cranium. This bone in the mammalia forms the incus of the middle ear according to a generally ac-

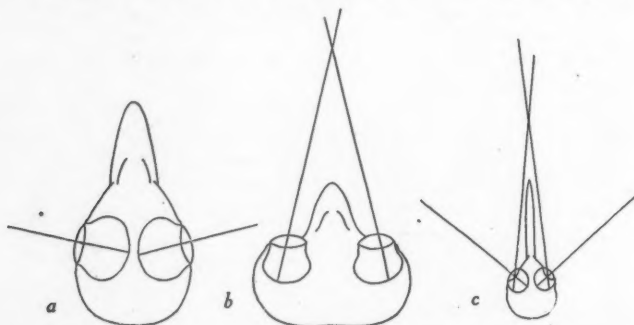


Fig. 41. a. DIAGRAM OF THE MONOCULAR VISION OF A CHICKEN. b. DIAGRAM OF THE BINOCULAR VISION OF AN OWL. c. DIAGRAM OF A HUMMINGBIRD'S HEAD. EACH EYE WITH TWO CENTERS OF ACUTE SIGHT GIVING BOTH MONOCULAR AND BINOCULAR VISION.

cepted view. In most reptiles the insertion of this quadrate in the articulation of the mandible makes a true double joint, but in the birds it is so firmly fused to the cranium that the hinge of the jaw lies between the quadrate and mandible. Nevertheless, the joint is perhaps freer, at least than in mammals, as it is farther removed from the base of the cranium.

With this, but of considerably more importance, is the length of the bill, which removes the grasping tip far enough from the eyes at its base to bring the work of the tip within the range of vision. As one result of this we find that the very finest nests are built by such birds as hummingbirds and the longer-billed insectivorous species, rather than by the conical-billed sparrows, whose nests are usually loosely constructed as compared with the nests of the preceding.

The smooth horniness of the bill, and the lack of teeth, are characters that permit the use of the bill as a shuttle or needle, making it an organ that can produce the beautiful woven nests of such forms as the orioles, or the interesting nests of the tailor bird, with leaves sewed about them. But even with these char-

acters, the primary food getting use of the bill overshadows all else, so that we do not find that all birds with needle-like bills make compactly woven nests. This form of bill merely permits such use rather than absolutely conditioning it.

An anatomical device that perfects nest building in certain species is binocular vision. Not all birds are possessed of this, as the primitive condition among reptiles was probably monocular vision. The common hen of the poultry yard looks her friends or enemies over, first with one eye, then turning her head, checks her observations with the other eye. She is handicapped by monocular vision. Not so those birds that pursue active prey, for in the hawks, in the owls, in many predaceous sea fowl and in most insectivorous groups the two eyes work together, both focussing simultaneously on the same object, giving these fortunate ones that greatest privilege of the senses, binocular vision. As a general rule vegetable feeders among birds do not possess this. Now of the birds pursuing active prey, which possess binocular vision, those that produce the most cunningly constructed nests are found among the insectivorous forms, common examples of which are the bush-tits, hummingbirds and orioles. However, binocular vision does not necessarily carry with it exquisite nesting habits, because, as stated before, the bill is primarily adapted to food getting, so, when such vision is associated with a raptorial bill as in the hawks and owls, the form of the bill itself precludes delicate work in nest building. Other factors than the form of the bill also enter into the type of nest built by birds with binocular vision. For example, the Limicolae, with this type of sight, together with bills that could be used for any ordinary nest building, usually construct the merest excuses of nests, frequently not much more than a depression in the ground. In this case probably the terrestrial habits of the group control the form of nest, for on the solid ground there is not needed that unity of structure and thoroughness of execution essential to nests attached to swaying limbs many feet above the earth. Nests are meager constructions or entirely lacking in the case of many predaceous sea fowl, in some instances perhaps because of the hooked bill, in others because the nest is secondary to the nesting site. Food being the primary consideration in a bird's life, sea fowl frequently occupy cliffs and rocky islets, which, though swept by every storm, are close to their fishing grounds and free from predaceous mammals. Because of their exposure such places are usually barren of nesting material; in the birds inhabiting such homes we often find instead of a nest to retain the eggs, that the latter are obovoid to the extent of being almost conical to prevent them from rolling off the rocky ledges.

Such is a brief sketch of some of the factors involved in the nesting habit of birds. It is an interesting subject, and would prove a rich mine of biological material to one well enough acquainted with birds to make use of the great mass of available data.

Cornell University, Ithaca, New York, February 24, 1917.

THE STATUS OF *APHELOCOMA CYANOTIS* AND ITS ALLIES

By HARRY C. OBERHOLSER

THE BLUE-EARED JAY, *Aphelocoma cyanotis*, was described by Ridgway¹ from a specimen collected by John Taylor at an unknown locality in Mexico. It was later discovered in the state of San Luis Potosi², and has since been found also in the states of Mexico, Hidalgo, Coahuila, and Durango; and it was reported from Sutton County, Texas, in 1902³. The Texas jay was first described by Ridgway as *Aphelocoma texana*⁴, from a specimen taken in Edwards County, Texas, near the head of the Nueces River. Both this and *Aphelocoma cyanotis* have since been regarded as distinct species. The material hitherto available from Texas has not been satisfactory, and identification of specimens of these two birds from that region has, therefore, in many cases been difficult. Recently, however, a large series of good plumaged birds was collected by F. B. Armstrong in Kerr, Sutton, and Edwards counties, and is now in the collection of John E. Thayer, to whom the writer is indebted for the privilege of examination. Study of this fine series and of the other specimens available, altogether sixty-seven examples, shows clearly that *Aphelocoma cyanotis* does not occur anywhere in Texas, since all individuals from the state so identified turn out to be *Aphelocoma texana* in very fresh plumage. This discovery readily accounts for the difficulty hitherto experienced in identifying specimens of these two jays from Texas. The Texas bird (*Aphelocoma texana*) is, however, separable from *Aphelocoma cyanotis* by reason of its smaller size and rather lighter breast, the latter character most appreciable in worn plumage. From these facts it follows that *Aphelocoma cyanotis* must be eliminated from the list of North American birds, as well as from that of Texas.

The examination of the above large series of *Aphelocoma cyanotis* and *Aphelocoma texana*, and of other related jays of the same genus, brings up some interesting points in addition to those already stated, and proves conclusively that several changes are necessary in the current status of these and allied forms. In the first place, *Aphelocoma texana* intergrades with *Aphelocoma woodhouseii* (Baird), as intermediate specimens from the Davis Mountains, Texas, show. The differences between *Aphelocoma texana* and *Aphelocoma cyanotis* are entirely bridged over by numerous intermediate specimens, and the two must be regarded as only subspecifically different. The latter intergrades geographically through the state of Puebla, Mexico, with *Aphelocoma sumichrasti* Ridgway, of southern Mexico; and also, at least individually, with *Aphelocoma grisea* Nelson, of the states of Chihuahua and Durango, in Mexico. Furthermore, the individual variation in *Aphelocoma sumichrasti* covers the difference between this form and *Aphelocoma californica californica* and *Aphelocoma californica hypoleuca*. Consequently there is no logical course open except to regard all the above-mentioned jays, hitherto all considered distinct species, as subspecies of a single specific type. It is, therefore, necessary to call them all subspecies of *Aphelocoma californica*, since this is the oldest name applied to any form of the group.

The bird described by Joseph Grinnell⁵ as *Aphelocoma californica immanis*, from Seio in the Willamette Valley, Oregon, has commonly been considered a

¹Manual North Amer. Birds, 1887, p. 357.²Jouy, Proc. U. S. Nat. Mus., XVI, 1893, p. 781.³American Ornithologists' Union Committee, Auk, XIX, July, 1902, p. 321.⁴Auk, XIX, January, 1902, p. 70.⁵Auk, XVIII, April, 1901, p. 188.

synonym of *Aphelocoma californica californica*. A recent examination of specimens, however, shows that it is a recognizable race, differing from *Aphelocoma californica californica* in its larger size, particularly of wing and tail, and in its somewhat paler, and in fresh plumage, slightly more grayish, blue of upper parts. It occupies the western part of Oregon and the northern part of California; and we have examined specimens from the following localities:

Oregon: Klamath Falls.

California: Goose Lake; Dana; Ice Caves, six miles southwest of Tule Lake; Picard; Lake City; and Lassen Peak.

The Florida jay, *Aphelocoma cyanea* (Vieillot) (= *Aphelocoma floridana* [Bonaparte]) seems, however, to be a species distinct from any of the above, since it differs constantly in its pale forehead and pale sides of the pileum; also *Aphelocoma insularis*, by reason of its very large size and much darker coloration, appears to be trenchantly different from any of its allies, and thus specifically distinct.

With the changes indicated above, the forms of what might conveniently be called the *Aphelocoma californica* group will stand as follows:

Aphelocoma cyanea (Vieillot)

Aphelocoma californica californica (Vigors)

Aphelocoma californica immanis Grinnell

Aphelocoma californica obscura Anthony

Aphelocoma californica hypoleuca Ridgway

Aphelocoma californica grisea Nelson

Aphelocoma californica cyanotis Ridgway

Aphelocoma californica sumichrasti Ridgway

Aphelocoma californica texana Ridgway

Aphelocoma californica woodhouseii (Baird)

Aphelocoma insularis Henshaw.

Washington, D. C., March 9, 1917.

BIRDS OF THE HUMID COAST

By FLORENCE MERRIAM BAILEY

WITH ONE ILLUSTRATION

(Concluded from page 54)

VI. IN THE BRACKEN

ONE of the choicest parts of this half cleared strip of land surrounded by forest was an acre of high bracken, the west coast form of the brake, adjoining the carpenter's garden and strawberry bed, solid fern threaded only by narrow trails leading down on one side to the New Englander's in the clearing and on the other to the fishing village by the Bay. Looking off over the fern field to the south there was a rich satisfying mountain view, the wide timbered V of Miami Notch, through which was seen, in the morning light, a sunlit forest; in the afternoon shadow, a rich purple mountain mass. On warm days the view through the notch was softly veiled, while the trees outlining the notch stood in idyllic haze. To the west, between framing conifers could be had glimpses of the Bay which at high tide was banded purple and pale green with brown

stripes marking the sand bars, while across the Bay the strong blue outline of Mt. Helo and the Coast Range to the south, often seen with white clouds above them, made easily surmounted barriers over which the mist crept in from the ocean.

As we were close to the ocean and the rainy season was not yet over, the mist seemed to be always creeping up from the sea to spread over the mountains, and from the fern field there were ever changing effects of fog between the adjacent inland ridges, wisps of fog rising lazily like smoke among the trees or floating off and getting caught in the tree tops. Even the weather prophet took note of it—"If the fog goes up, it'll rain; if it goes down, it'll clear," the saying was quoted. The strong invigorating ocean breeze that came to the fern field every afternoon bringing the voices of Gulls from the shore, on clear days was tempered by the warm sunshine that, resting on the bracken brought out their delicious fragrance.

On the borders of the fern field were small groves of young conifers, where Thrushes and other birds that found food in the open could retire to safe nesting places. From these groves, in one of which the family of Screech Owls roosted in the day time, reaching out over the bracken were rugged, prickly, long-fingered Sitka spruces, and hemlocks with their gracefully drooping branches hung with tiny cones, that bowed like ostrich plumes in the wind. In strong sunshine the exquisite light green tips of the new foliage made the dark shadowed trees look fairly green jewelled, as beautiful as flowers. At the foot of the fern field passing birds could gather a plentiful harvest of salmon berries.

Over the clearing Vaux Swifts were occasionally seen hurrying by, and after the familiar *peent* of a Nighthawk had been heard by the shore, two of the birds were seen flying around up in the fog at sunset. The sweet-voiced Willow Goldfinches were often seen loitering around the fern field. The female was in darker dress than the eastern Goldfinch but the male as strikingly yellow and black as any of his tribe, the yellow so bright that it was surprising to have it fade to white against the green of a hemlock. The joyous flight song was heard over the fern field about the middle of June and one of a pair seen with nesting material in her bill stopped to pick at the partly ripe head of a bull thistle. When the birds get a billful of unmanageable down, as from a clothesline, it was reported with assurance, they fly up to a hemlock branch and stick it together by rubbing it against the soft hemlock gum! On the last day of June a Goldfinch was heard singing at length and with happy emotion. Perhaps a nestfull of eggs had hatched! Other late builders, Waxwings, with raised crest and clear yellow tail band, were seen on a red huckleberry bush where they were apparently feeding.

One day as I sat among the bracken a Rufous Hummer with a squeak and a whirr came whirling low over—me?—or was it over my neighborhood where some invisible feathered lady was in hiding? When a male was peaceably sitting on top of a small hemlock, another, possibly a rival, dived down at him, hurtling him off at a wide angle. Several were chasing after each other one day with nothing to indicate the merits of the case, and twice, greatly to my surprise I discovered a Hummingbird in hot pursuit of an inoffensive Swallow—such heights of arrogance may even a pinch of feathers attain!

But though many an attractive bird was seen flying about over the green bracken, the one whose song and presence harmonized best with the fragrant fern field was the Russet-backed Thrush. Two were singing their sweet mu-

sical *hoit, whoite, tra-la-la-ree*, on opposite sides of the green acre at one time, one of them perched on the tip of a stake beside me quite unafraid, when a Robin spied a prowling cat and made such an outcry that, much to my disappointment the concert stopped abruptly. Before family cares became too engrossing, the lovely Thrush songs might be heard at almost any time of day, sung perhaps within hearing of happy brown mothers brooding their nests in the bordering groves. While the sweet song seemed best suited to the open clearings and fragrant fern fields, at its deepest moments—in the quiet evening hours and at the nest—it went well with the richly shadowed hemlocks, with the sound of the wind through the spruces, and the cool strong air from over the sea.

One of the trails through the fern fields led to a fence where Goldilocks went mornings for a pail of milk that hung from a rail, went protected by her two dogs, for across the fence down a dark trail through the forest a black bear had gone not long before—had gone ambling by the Pileated's stub on through the dark woods to a small wood garden where pink Canterbury bells nearly twice a bear's height bordered the trail, and then up across a monster fallen log that blocked the way and was easier to surmount with four feet than two—fearsome trail—no wonder the little milk maid's heart beat hard and she kept her protectors close at hand!

Just beyond the fence where the milk pail hung above the bracken, stood one of the white mottled alders with its multiplicity of slender branches and cocoon-like cushions of greenish brown moss then being shipped out in bales to California florists. The light green leafy alder top was one of the favorite hunting grounds of a Western Flycatcher, but only occasional glimpses could be caught of twitching shoulders or other fragmentary parts of avian anatomy as he flitted about in the thick sunny tree top. Once I did get a really good view of his olivaceous back as he sat on a branch singing a weak disjointed song that after all was rather pleasing and was apparently eminently satisfactory to himself. *See-wick-ee-wick-ee, see-wick-ee-wick*, it ran, varied by *e-pa-seb, pa-sub*, a jerk of the tail following the terminal *seb* or *sub*. After singing his song over and over till partly perhaps from its association with the sunny tree top, it began to sound very sweet in my ears, he fell back on his familiar call of *see-wick*, willingly answering my poor imitations of his notes for a time, and then flying on into the alders and conifers by the brook, where he was lost sight of in the dense thicket.

Another small Flycatcher, presumably *trailli*, was seen several times on a small dead tree in the middle of a neighboring clearing with the sun shining full on his white breast, contentedly calling *pre-ep'-pah-deer, pre-ep'-ah-deer*, his notes punctuated by jerks of the tail.

In the top of a young hemlock near our fence line, a Seattle Wren often sang a bright clear musical song, or rather a variety of songs, for his flexible voice made variety easy. The general form and rhythm sometimes suggested the *pill-a-will* of the black Towhee, but the wrennish burr and quality were characteristic. Sometimes it was *bur'r'r will-ahwill*, or *bur'r'r willahwillahwill*; again *pur'r'r-will, will, will, will, will, will, will, will, will, will, will, will*; or *tu-wee' wata, wata, wata*. Once the Wren gave a single short note and then four notes strikingly loud and clear; and again four repetitions of the same note with the fifth note dropped, *he-he-he-he ha-ha-ha-hup*.

From the fence at the foot of our fern field a trail led through the bracken

higher than my head down to the brook and so to a pasture beyond; and along the line of this fragrant fern trail sitting on my camp stool with the bracken closing me in, the tips of the triangular fronds uncurling over my head, I spent many pleasant hours watching the feathered passers-by. Once there came the soft musical, almost tender *wick-up, wick-up, wick-up* of a Red-shafted Flicker close beside me, and when the two went by, the *if-if-if-if-if* was heard. After one of the big birds had flown overhead, a conspicuous object with its red underwings and white rump patch, it lit on the shadowed side of a hemlock trunk and vanished so completely that I could barely make out the form of its head and neck.

The small yellow forms of Lutescent Warblers were often seen during June disappearing in the bushes about the garden and fern field, though the quiet little birds were not so much in evidence as the Golden Pileolated Warblers with their keener colors and louder voices. But on the first of July a Lutescent was found feeding young near the fern trail. Twice it almost flew into me, it was so preoccupied. As it went in and out of a small spruce and flew back and forth over the bracken I had ample opportunity to notice how well its soft green plumage toned in with the yellow green of the sunlit ferns and spruces.

The next day, as one of the white dogs was with me, I created quite a disturbance down the fern trail. For how could anxious parents be expected to distinguish between a white dog and a white cat? Though the voices of young birds were heard, they were prudently kept out of sight. A female Black-headed Grosbeak—with her yellowish brown breast and the white median crown stripe that gives the odd effect of hair parted in the middle—flew onto the tip of a young hemlock and said *ick* at us, but she did not seem greatly disturbed and when her mate came he took us even less seriously, after intelligent inspection beginning to sing. But the white dog marked us for suspicious characters and a Seattle Wren came peering down at us, three black-capped Pileolated Warblers looked enquiringly as they flipped through the bushes, a Russet-backed Thrush and a Song Sparrow examined us, and a Rufous Hummer glanced down as he whizzed by.

Though there was no telling how many Pileolated Warblers and Russet-backed Thrushes there were in the compressed fifty-rod nesting area, the Grosbeaks were apparently the third pair in the immediate neighborhood. Farther down the fern trail my attention was attracted by a Swallow note and looking up, perched jauntily on top of an old gray stub was a rufous-backed Sparrow Hawk, around whom, for reasons best known to themselves, two White-bellied Swallows, perhaps my friends from the nest in the stub, were clamorously flying.

VII. THE BAND-TAILS

Near the foot of the fern trail one day I stopped to enjoy the view of Miami Notch with its purple background, and to look up at a row of noble old hemlocks and Sitka spruces fronting the strip of timber between the clearing and the Bay, in which as it proved a flock of perhaps fifty of the large Band-tailed Pigeons made their headquarters. Studying the line of tall trees, their large trunks sun-patched, their branches waving in the afternoon sea breeze, two stood out conspicuously, one a great clean boled spruce with big cushions of moss on its branches, the other a bare-tipped lofty mast, good for passing

Eagles to light on. Flanking the row of tall bare-trunked trees was a younger stand of conifers, handsomely branched to the ground.

As I gazed up at the trees, suddenly a flock of about fifteen of the large virile Pigeons flew out of their dark depths. A few moments later a loud noise of wings in the direction of the pasture below was followed by the appearance or reappearance of a close flock of fifteen or twenty which quickly vanished in the cool dark timber. As I watched the tree tops in which they had disappeared, through the dense evergreen branches I now and then caught suggestive glimpses of a head and neck or, as one rose, the band of a square spread tail, and heard the sound of whacking wings and movements among the branches, together with the characteristic hooting—*hoo'-ha-hoo*, *hoo'-ha-hoo*; or *hoo'-oo-hoo*, *hoo'-hoo-ugh*, and *oop'-oo-ugh*, given with mouthed pouter dove quality. While the Pigeons hooted high in the tree tops, from the undergrowth around me came the songs of Western Robins, California Purple Finches, Rusty Song Sparrows, and Russet-backed Thrushes.

Wherever a Pigeon was seen or heard he became the center of interest, whether flying from a high tree-top across the sky with powerful arrowlike flight, hooting in low subdued tones from his hiding place in a dense evergreen top, or hooting loudly from the top of a lofty stub—one was seen on top of the two hundred foot stub that marked our clearing—hooting in Owl-like cadences—

Whoo-ah, hoo-hoo'; *whoo-ah, hoo-hoo'*; *whoo-ah, hoo-hoo*; or *who-ah-hoo, who-ah-hoo*.

Two that I saw about the middle of June around an old dead spruce suggested courtship maneuvers. One, as if on exhibition, sailed on outspread wings completely around the top of the tree, after which it perched on a high branch beside its audience. This soaring before one witness was seen twice within a few days. Once hearing a whirr through the air I looked up to find two Band-tails crossing overhead with their swift powerful flight. Another time I startled a flock along a wood road where there was an abundance of salmonberries, and they kept flying up, whacking wings, till it seemed as if there must have been fifty in the flock.

In the afternoons, generally between three and four o'clock, the Band-tails left their tree-top headquarters and flew, in flocks of varying size, across to the mountains. One day at 3:20 a flock of about twenty-five straggled over; another day at 3:45 when I had about given them up the sound of wings attracted my attention and ten birds started from the big spruces. Still later, at 4 o'clock one afternoon I saw a flock round a spruce top, swing out clear of the trees, and come up through the sky towards the mountains. As both open water and berries of various kinds were to be found on the slopes, the birds probably went both to drink and to feed. Elderberries, huckleberries, and salmonberries were all on the bushes at the same time. So many elderberries are eaten by the Pigeons, I was told, that at times their meat is bitter from them, while the bear berries or cascara that also grow in the Coast Mountains are such a favorite food that the Pigeons will go to a tree of them when in the midst of other berries.

Thinking that perhaps the Pigeons drank from the school reservoir up in the woods, in which direction they generally flew, I went up one afternoon to see if I could find any of them there. Though none were found at the time, berry bushes were in bearing just below, and the birds might well come to drink in the

beautiful spot, the most beautiful of any seen in the region. From a mountain spring the water came tumbling down a narrow wooded gulch between moss-covered banks and among mossy logs and clusters of tall spreading fern fronds into the clear pool of the reservoir, shadowed by a brotherhood of noble hemlocks, their branches hung with swaying pale green moss. Here in the solemn conclave of Druids, where the wind sings with hushed voice, from the moss



VARIED THRUSH

From Bailey's "Handbook of Birds of the Western United States." By courtesy of Houghton Mifflin Company.

and ferns of the rich earth carpet came the call of the little brown woodlander, the Winter Wren, a lover of just such forest depths. And it was easy to imagine a band of the great Pigeons hooting solemnly from the tree tops overlooking the clear water of the beautiful pool.

VIII. A VOICE FROM THE HEIGHTS

Above the chorus of the Humid Coast belt three soloists stood apart, not from any brilliancy of execution or charm of vocal accomplishment, but from their deep human appeal, their rare moving quality. The clarion *pu-pu-peo*, or the keener *pu-pec-peo*, of the Olive-sided Flycatcher from the hills aroused rich mountain memories, as did also the fresh uplifted song of the Nuttall Sparrow, whether heard from a fern field, a tree top overlooking the fishing village and the quiet inland waters of the blue Bay, or from a cliff overlooking the wide sandy beach and the long white lines of surf coming in from the ocean.

But there was one voice that was new to me, whose appeal was reinforced by no rare memories, though given glamour by Alaskan song and story—the voice of the Varied Thrush. Its single note with its mysterious vibrant trill had been heard from the mountain tops in the chorus of morning and evening; and on one red letter day, from the wood road one of the rare birds had actually been seen near enough to distinguish its golden brown, dark-collared breast.

But not until one Sunday morning when I was sitting quietly in the fern field, did I really hear the wonderful song. Then through the clear air, each single, long-swelling note came down from the ridge above like the peal of a golden bell. It was indeed a Voice from the Heights! The best songs from the lower levels and even those of the Olive-sided and the Nuttall Sparrow but lead up to it, for the song of the Sparrow is full of plaintive yearning, and the call of the Flycatcher, pure and clarion toned though it be, has a note of striving in its exaltation; but the voice of the Varied Thrush seems the voice of one who has attained. And as it comes from the Heights with their far view over the ocean, it seems to voice the serene philosophic spirit by which life, death, and the veiled hereafter seem but links in the chain of the ordered Universe, upon which, with bared head, one may gaze, content to bear his part.

Washington, D. C.

FROM FIELD AND STUDY

Peculiar Nesting Habits of the Avocet.—While collecting on the south shore of Big Quill Lake, Saskatchewan, on June 22, 1915, on a low, sandy island I found three nests of the Avocet (*Recurvirostra americana*). Nest number one contained four eggs on the point of hatching. Number two, six eggs, three of which were fresh and three on point of hatching! Number three, eight eggs, all fresh. During the time I was on this island, nearly two hours, I counted ten birds. On June 8, at Buffalo Lake, on a small low island, I found only one nest containing seven fresh eggs, though I counted there eight birds.

Mr. W. E. Lake, of Edam, Saskatchewan, a reliable observer, told me he had noted Avocets breeding in his district for some years, and of having found nests containing from three to eight eggs.—H. H. MITCHELL, *Regina, Saskatchewan*.

The Surf Bird at San Francisco.—On November 5, 1916, a very exceptional opportunity was afforded the writer for observing a flock of Surf-birds (*Aphriza virgata*), on the boulder-strewn beach below San Francisco's famous Cliff House. I had been looking seaward through the powerful binoculars that may be rented on the piazza, when my attention was attracted by nine of these birds on the ledges almost directly beneath. Upon adjusting the glass to proper focus, the birds were revealed in startling proximity, appearing scarcely an arm's length distant and permitting of the most minute inspection.

They were busily engaged in exploring the mossy buttresses, and apparently were not at all alarmed by the numerous visitors on the terrace above, though acknowledging their presence by pausing from time to time to look upward. They worked industriously

and continuously, evidently finding an abundance of food, without, however, prying off Crustacea from the rocks as observed by Mr. Dawson at Santa Barbara. Whatever their diet, it was gleaned with but small exertion amid the moist seaweed, and consumed in great quantities and with avidity.

Each individual was quick to resent intrusion, and the encroachment of a neighbor upon another's "sphere of influence" usually resulted in a sharp "passage-at-bills", three of which were noted within the short space of time the birds were under observation. The protective coloration feature of their autumnal plumage was very pronounced, particularly in an instance where a bird crouched down for a moment, remaining immovable and almost invisible, the dusky gray of its back blending most harmoniously with the surf-worn rock. The contrast was the more noticeable because of the distinctive appearance of the same bird while in motion, the upraised wings with their broad, exposed portion of white, rendering it very conspicuous.

Unlike many of our shore birds the initiative of all, in this particular case at least, did not depend upon the alarm of some, and though it may be presumed that in any extended flight the wanderers clung together, yet the excited departure of three birds, startled by a paper fluttering down the cliff, was but disinterestedly watched by the remainder. The flock continued feeding for some moments longer, and then rising rapidly one after another, swung about the point and disappeared.—GEORGE W. SCHUSSLER, *San Francisco, December 18, 1916.*

Vermilion Flycatcher at San Diego, California.—While visiting at Nestor, at the south end of San Diego Bay on December 25, 1916, I saw a Vermilion Flycatcher (*Pyrocephalus rubinus mexicanus*) busily engaged in catching flies in front of the house where I stayed. At the same place on March 17, 1906, I saw another individual of this species, hawking for flies all day long from the fence. These are the only two I have ever seen here, and it is curious that I should have seen them at exactly the same place. It is not surprising that these birds should occur here occasionally, however, as there are no high mountain ranges to bar them from leaving the desert region to the eastward.—HENRY GREY, *San Diego, California, February 23, 1917.*

Early Nesting of California Brown Pelican on Anacapa Island, California.—I was on Anacapa Island on March 12, 1911, when there were about two hundred pairs of Pelicans (*Pelecanus californicus*) on the island. None of them had eggs at that time, although a few had started nest building. I visited the island again on May 12, 1912, finding that the colony had not increased in size during the year. Most of the nests were ready for eggs at that time, but there were only two fresh eggs to be found. On June 11, 1915, the colony had increased noticeably and had divided into two sections, one on the top of the island and the other on the slope under the cliffs on the south side. The one on top had a few newly hatched young, but in most cases there were eggs, fresh or nearly so. In the colony on the south side all of the eggs had hatched, and most of the young were nearly grown.

On March 7, 1916, we estimated that there were at least fifteen hundred pairs of birds upon the island, in two colonies, as before. The nests on the south side contained three eggs each; most of those on the top of the island were just completed, though one set of three fresh eggs was seen there, and a few with two eggs. This year (1917) we were on the island on March 2. There were at least two thousand pairs of Pelicans in the colony, and they were already breeding. In fact, most of the eggs were heavily incubated, and in one nest there was a newly hatched young, together with two eggs on the point of hatching. Many sets of four eggs were seen, and one set of three was collected containing a runt egg about the size of a hen's egg.

From the above data it appears that the colony is increasing rapidly in numbers, and that the birds are nesting earlier every year.—SIDNEY B. PEYTON, *Sespe, California, March 24, 1917.*

Early Nesting of the San Diego Song Sparrow.—Mr. P. J. Hartman tells me that on February 20, 1917, he found a nest of the San Diego Song Sparrow (*Melospiza melodia cooperi*) near La Habra, Orange County, California. The nest was placed in a dock plant ten inches above the ground, and contained four eggs with incubation going on.—W. LEE CHAMBERS, *Los Angeles, California, February 23, 1917.*

Bohemian Waxwing in Mariposa County.—There have been recently added to the bird collection of the California Museum of Vertebrate Zoology, four specimens of the Bohemian Waxwing (*Bombycilla garrula*), nos. 27561-27564. These birds were secured by Donald D. McLean from a flock containing about sixty Bohemian Waxwings and three Cedar Waxwings, at Smith Creek, six miles east of Coulterville, Mariposa County, California, altitude about 2800 feet, on January 31, 1917. A few days earlier a similar flock was noted. There has been no reported instance of the occurrence of this species within California since 1911, in which year numbers were observed and specimens secured in several places, from Galt, Sacramento County, northward.—TRACY I. STORER, *Berkeley, California*.

Large Sets of Eggs of the California Woodpecker.—On May 4, 1916, I collected a set of ten eggs of the California Woodpecker (*Melanerpes formicivorus bairdi*) from a drilled cavity in a pole carrying electric wires. The cavity was about two feet in depth and about six inches in diameter, and was about fifteen feet from the ground. The eggs were all about half incubated and were all of the same type, so I think they were all laid by one bird. The nest was visited a week later, May 11, and there was nothing in it. On May 29 I was much surprised to find the nest full of newly hatched young. I removed the empty shells of nine eggs, but did not remove any young, so I am not certain as to how many there were in the second laying. The same day I collected a set of seven eggs of the same species from another pole, two poles down the line. There were two runts in this set, smaller than Chipping Sparrow eggs.—SIDNEY B. PEYTON, *Sespe, California, March 24, 1917*.

Zone-tailed Hawk at San Diego, California.—While walking to the street car from my house, December 20, 1916, I saw a black hawk flying towards me along the hill side. It came straight over head, but a short distance away, paying no attention whatever to my presence. It hunted along the hill side and in the adjoining canyon, in action much like a Marsh Hawk, finally perching on a gum tree in front of a house. The next morning a hawk, undoubtedly the same bird, was brought to me for preservation. It was a male Zone-tailed Hawk (*Buteo abbreviatus*), shot at close range and badly mutilated. It had evidently eaten a meadow lark just before going to roost the previous night, and it had been shot near the same place where I first saw it.—HENRY GREY, *San Diego, California, February 23, 1917*.

Western Goshawk in Ventura County, California.—The following specimens of the Western Goshawk (*Astur atricapillus striatulus*), all taken in Ventura County, were received by Melvin Phillips, taxidermist at Fillmore, during the winter of 1916-17.

Male, taken by P. W. Robinson at Nordhoff, October 30, 1916. Male, taken by Earl Cole in Sespe Canyon, November 26, 1916. Female, taken by J. W. Bay in Ojai Valley, January 2, 1917. Female, taken by John Nicholson midway between Santa Paula and Ventura, February 27, 1917. The last mentioned specimen is now in the collection of J. N. Procter, of Ventura.

The two females were examined by George Willett, who states that they possess the dark shading of the under parts ascribed to the form *striatulus*.—SIDNEY B. PEYTON, *Sespe, California, March 24, 1917*.

Occurrence of the Red-breasted Nuthatch in Arizona.—On January 18, 1917, I observed a single Red-breasted Nuthatch (*Sitta canadensis*) near the northeast edge of the Coconino plateau, about forty miles south of Winslow, Arizona. The bird was seen in the pinyon and juniper zone, at an elevation of 7000 feet, in company with Pigmy Nuthatches, Rocky Mountain Nuthatches, Gray Titmice, Mountain Chickadees and Lead-colored Bush-tits. Swarth in his "Distributional List of the Birds of Arizona" states that there are very few Arizona records of this bird, the last given being that of Gilman, at Sacaton in 1910. My only other record for Arizona is that of a single individual seen in Schulz Pass, in the San Francisco Mountains, on October 15, 1914, at an elevation of 8500 feet.—OSCAR F. SCHAEFER, *U. S. Forest Service, Flagstaff, Arizona, March 20, 1917*.

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EDITORIAL NOTES AND NEWS

It may prove stimulative to western bird students to know something of the ornithological work in progress among their fellows. The following data gathered by the Editor are not likely to be anywhere near complete, and further information is desirable, particularly from persons not here mentioned. Mr. Edward R. Warren, of Colorado Springs, has in preparation an extended paper on the life history of the White-tailed Ptarmigan in Colorado. Mr. George Willett is working toward the compilation of a popular handbook on the birds of southern California, an extension in scope of Avifauna No. 7. Dr. T. S. Palmer, of the Biological Survey, Washington, has for some time interested himself in the biographies of American ornithologists. In his researches in the annals of western ornithology he has come across some interesting information in regard to the routes of such early field workers in California as Gambel, Heermann and Kennerly. All this information it is planned to present in a series of articles. Dr. Palmer is also making a nomenclatural study of the various names applied to the Red-

breasted Sapsucker. Dr. W. H. Bergtold, of Denver, is making an elaborate investigation of the period of incubation in birds. Mr. Aretas A. Saunders is preparing a state list of the birds of Montana which will probably be published as one of the Cooper Club Avifauna series. Mr. George Finlay Simmons, of Houston, Texas, is engaged in working up the birds of the Austin region for publication by the University of Texas. Dr. Harry C. Oberholser, of the Biological Survey, Washington, has practically finished a comprehensive report on the birds of Texas, the early publication of which is looked forward to with interest by all those who know of Mr. Oberholser's painstaking methods of work. Dr. L. H. Miller, of Los Angeles, has in preparation an exhaustive report on the Avifauna of the Rancho La Brea, summarizing all that he has learned during his several years study of that wonderful fossil deposit. Mr. Donald R. Dickey, of Pasadena, is making a study of the California Jay with special respect to its feeding habits and its relation to other birds through the destruction of their eggs and young. This is to be illustrated by a number of remarkable pictures showing the jays in action. Mr. E. M. Anderson, of Victoria, B. C., is continuing his field work in British Columbia, with a view to ultimately compiling a fully annotated list of the birds of that province. Mr. J. E. Law is working up the systematic status of the Cliff Swallow in the West, and of the Palmer Thrasher in Arizona and Sonora. Mr. J. L. Sloanaker, of Kallispell, Montana, is assembling information concerning the birds of Flathead County, supplementary to that already published by other authors. Mr. H. S. Swarth, of the staff of the California Museum of Vertebrate Zoology, is revising the systematic status of the brown towhees and of the jays of the genus *Aphelocoma*. Dr. H. C. Bryant, continues his work on food of various California birds; just now the ducks are claiming his attention. Mr. T. I. Storer is occupied with a study of the Natural History of the Yosemite region. Dr. J. Grinnell is collaborating with Mr. Storer in his work on the Yosemite natural history, and is also putting much time on a second installment of his bibliography of California ornithology.

We are indebted to Mr. J. Eugene Law for getting up the Cooper Club membership list appearing in this issue. There is a total of 601 names. In compiling this roster each name has been cited as its owner usually signs it (except that titles, "Prof.", "Dr.", etc., are inserted between surname and given names) rather than by any consistent scheme of using one or all given names in full, or only the initials. Members are requested to notify J. Eugene Law, Business Manager, Hollywood, California, of any errors or changes in name or address.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

JANUARY.—The regular meeting of the Northern Division of the Cooper Club was held at the Museum of Vertebrate Zoology, the evening of January 18, 1917, at eight o'clock. The following members were present: Messrs. Carriger, Evermann, Grinnell, Hansen, Storer and Swarth, Mesdames Allen, Meade, Schlisinger and Wythe. The minutes of the December meeting were read and approved.

Miss Emma Ward of Alameda and four others, whose applications had been sent to the Southern Division, were elected to membership, and the following names were proposed: Mrs. Harriet P. Kelley, Berkeley, by H. C. Bryant; C. R. Smith, San Francisco, by Harold E. Hansen.

The election of officers for the year 1917 was then called for, and the secretary was instructed by vote of the Club to cast the ballot for the following: for President, Dr. Barton W. Evermann; for Vice-president, Rev. W. A. Squires; for Secretary, Mrs. J. T. Allen.

Dr. Grinnell then gave a short talk on "An invasion of Goshawks into California", showing specimens to prove that the records of this winter are of the American Goshawk and not of the western subspecies. Two more specimens of the "Tule Goose", a giant form of the White-fronted Goose, found to be quite numerous in the marsh lands of the Sacramento Valley, were exhibited by Mr. Swarth. Many informal observations were contributed by different members present, after which the meeting adjourned.—AMELIA S. ALLEN, *Secretary*.

FEBRUARY.—The regular meeting of the Northern Division of the Cooper Club was held at the Museum of Vertebrate Zoology on the evening of February 15 at 8 o'clock. The meeting was called to order by the President, Dr. Evermann, with a large number present, among whom were Messrs. Anderson, Bryant, Carriger, Dixon, Evermann, Grinnell, Hansen, Heinemann, Lastreto, Littlejohn, Ray, Squires, Storer, Swarth, Webb, Wright; Mesdames Allen, Alexander, Bryant, Culver, Dixon, Field, Lueddemann, Kelley, Meade, Newhall, Price, Ray, Schlisinger, and Wythe. Visitors: Mrs. Elliott, Miss Straight, Miss Burt, Mr. Martens, and Mr. Meade.

The minutes of the January meeting were read and approved, and those of the Decem-

ber and January meetings of the Southern Division were read. Mrs. Harriet P. Kelley and Mr. C. R. Smith, whose names were proposed at the January meeting, were elected to membership. Mrs. E. G. Witter, Berkeley, was proposed for membership by Mrs. J. T. Allen, and eleven other names proposed at the December and January meetings of the Southern Division were submitted for approval.

Plans for the meeting of the Pacific Division of the American Association for the Advancement of Science, to be held at Palo Alto on April 5, 6 and 7, were announced by the President. Mr. Lastreto, recently elected President of the newly formed Audubon Association of the Pacific, told of the work awaiting them. On motion of Mr. Swarth, the Northern Division adopted the resolutions passed by the Southern Division relative to the death of Dr. Mearns. A motion offered by Mr. Storer that the Cooper Club pay the annual assessment of Five Dollars to the Pacific Division of the American Association for the Advancement of Science was approved.

The Executive Committee then submitted for the approval of the Club the re-election of the present incumbents as business managers and editors of THE CONDOR, namely: Business Managers, Messrs. Chambers and Law; Editor of THE CONDOR, Dr. Joseph Grinnell; Associate Editor, Mr. Harry S. Swarth. These were declared unanimously elected. Dr. Harold Bryant reported on laws before the Legislature relating to destruction and conservation of bird-life.

The business having been disposed of, the Club was privileged to hear an account of "The Home Life of Some Birds on the Shores of Alaska" by Mr. Joseph Dixon. The account was beautifully illustrated by lantern-slides made from photographs taken by Mr. Dixon during his nineteen months' sojourn on the ice-bound seas beyond Point Barrow. Adjourned.—AMELIA S. ALLEN, *Secretary*.

SOUTHERN DIVISION

FEBRUARY.—Regular monthly meeting was held at the Museum of History, Science and Art. The following members were present: Messrs. Bishop, Brown, Colburn, Howell, Holland, Huey, Lamb, Little, Miller, Nokes, Van Rossem, Willett and Wyman. Mr. Paul Hartman was a visitor. Minutes of the January meeting were read and approved. On motion, the secretary was instructed to cast an electing ballot for the four persons

whose names were presented at the January meeting. Mr. Paul J. Hartman, Los Angeles, was presented for membership by W. Lee Chambers.

Mr. Willett, who has spent several weeks recently in the Sacramento Valley, reports that in the vicinity of rice fields the wild ducks are dying in great numbers, from feeding on that grain. He stated also that the "Tule Goose", apparently new to science, has long been known to hunters of north-eastern California. Dr. L. B. Bishop read some interesting notes on the discovery of the nest of the Tennessee Warbler in New Brunswick. Adjourned.—L. E. WYMAN, *Secretary*.

MARCH.—The regular monthly meeting of the Southern Division was held at the Museum of History, Science, and Art. President Miller was in the chair, with the following members in attendance: Messrs. Appleton, Brown, Bishop, Colburn, Chambers, Daggett, Dickey, Hanna, Holland, Howard, Howell, Lamb, Law, Layne, Rich, Rittenhouse, Willett, and Wyman; and Mrs. Law. Mrs. Howard, and Mrs. and Miss Brouse were visitors.

The minutes of the February meeting were read and approved, followed by reading of the January and February minutes of the Northern Division. Paul J. Hartman, of Los Angeles, was elected to membership. The following new names were presented: Robert R. Redington, Wilmington, Del., by Wharton Huber; Helen DeLange, La Jolla, Calif., by C. O. Esterly; J. Alden Thompson, Bend, Ore., by S. G. Jewett; Oscar F. Schaefer, Flagstaff, Ariz., by W. Leon Dawson; Geo. R. Gartrell, Summerland, B. C., by J. A. Munro; and the following names, which have already been presented to the Northern Division: C. R. Smith, San Francisco; Mrs. Harriett P. Kelley, Berkeley, and Miss Emma W. Ward, Alameda. The Executive Committee presented the names of Grinnell and Swarth, Law and Chambers, for re-election as Editors and Business Managers, respectively, of THE CONDOR. On motion by Mr. Willett, seconded by Mr. Daggett, these gentlemen were unanimously re-elected.

President Miller submitted the following:

"We, the undersigned, members of the Cooper Ornithological Club, hereby propose for honorary membership in the Club, Mr. E. W. Nelson, of Washington, D. C.

"Our reasons for wishing so to recognize Mr. Nelson's ornithological work are as follows: The candidate is Chief of the Bureau of Biological Survey, Department of Agriculture. It was chiefly through his efforts

that the Biological Survey has the finest and largest collection of Mexican birds in the world. He is undoubtedly the foremost authority on the habits and life of the birds of Mexico. He has done a great amount of field work and collecting within the borders of our state, and has added largely to the knowledge of the birds of California.

"We believe that the election of Mr. Nelson to honorary membership is but a just expression of appreciation of his services to ornithology." Signed: A. B. Howell, W. Lee Chambers, J. Eugene Law, L. E. Wyman.

On motion by Mr. Daggett, seconded by Mr. Dickey, Mr. Nelson was unanimously elected to honorary membership.

Business disposed of, an hour of informal discussion of bird matters followed. Adjourned.—L. E. WYMAN, *Secretary*.

INTERMOUNTAIN CHAPTER

JANUARY.—Meeting was called to order at 8:20 P. M. There were present: Dr. D. Moore Lindsay, J. Sugden, Dr. J. H. Paul, F. W. Chambers, A. O. Treganza, J. A. Sugden, A. D. Mullen and Ashby D. Boyle. President Paul was in the chair. Reading of minutes of the December meeting was deferred until the February meeting.

Dr. J. H. Paul reported upon a conference had by him with the Commissioners of Salt Lake City relative to action by the city toward the extermination of the English sparrow. The Commissioners present declared themselves, according to the report, favorably inclined and asked the Doctor to so notify Commissioner Green. It was moved and seconded that the secretary compile an article on the extermination of the English sparrow from data to be submitted by the individual members of the club, and publish the same under the name of the Chapter. It was moved and seconded that Dr. Paul's report be accepted and that he be urged to continue the work. Mr. Treganza reported the result of a call made by Dr. Paul and himself upon Governor Bamberger to discuss the appointment of the State Game Commissioner. The official recommendations of Mr. Chambers, retiring State Game Commissioner, were read and officially approved by the club. Meeting adjourned at 10 P. M.—A. D. BOYLE, *Secretary*.

FEBRUARY.—Meeting was called to order at 8:30 P. M. There were present: Dr. J. H. Paul, F. W. Chambers, J. Mullen and Ashby D. Boyle. President Paul was in the chair. Dr. Paul read to the meeting a for-

mula for poisoning sparrows, recently given out to members of the club by Dr. A. K. Fisher. Owing to the relatively small attendance, the evening was given over to general discussion of the English Sparrow campaign, the proposed new game and fish laws, also a mention of the spring migrants already here, and other matters of current interest. Meeting adjourned at 9:35 P. M.

—A. D. BOYLE, *Secretary*.

SAN BERNARDINO CHAPTER

FEBRUARY.—The February meeting of the San Bernardino Valley Section of the Cooper Ornithological Club was held on Sunday afternoon, February 4, 1917, at the residence of Professor F. H. White, Claremont, California. Those present were Professor and Mrs. White, Halsted G. White, Wright M. Pierce, Howard Edwards and Mrs. Edwards, Miss Pierce, Miss Hazel Burnham, all from Claremont; Miss Ruth Pierce, Glendale; A. B. Howell, Mr. Little, Covina; M. French Gilman, Mrs. Gilman, Mr. Gilman, Banning; Edward Wall, San Bernardino; C. G. Wiggins, Wilson Hanna and Mrs. Hanna, Judge Hanna, Miss Tacie Hanna, J. R. Pemberton and Mrs. Pemberton, Colton. The subject previously arranged for the meeting was sparrows. A large collection of the various species of sparrows and allied forms was brought together by the members, and a general discussion of all matters pertaining to that group was eagerly entered into by everyone.

Miss Hazel Burnham exhibited her collection of both pen and ink and colored drawings of study skins, remarkable for detail, and for the painstaking care which had been taken in their preparation. The Turkey Buzzard belonging to Halsted White, and which has been exhibited at all previous meetings, was present with the sparrows under the name *Cathartes aura sandwichensis frontalis socialis*! An innovation was introduced by Arden Edwards, following the serving of refreshments, by the drawing of a lottery, the winner of which, Miss Tacie Hanna, received a beautiful, framed, water-color drawing of the Golden-crowned Sparrow, executed by Mr. Edwards. The lottery tickets consisted of verses alluding in jocular terms to the now famous Turkey Buzzard. It was agreed to hold the next meeting early in March at the home of M. French Gilman at Banning, and no special subject was arranged to be discussed, as all desired more particularly to view Mr. Gilman's collection. Adjourned.—J. R. PEMBERTON, *Secretary*.

DIRECTORY OF MEMBERS OF THE COOPER ORNITHOLOGICAL CLUB

Revised to May 1, 1917

(Residence in California unless otherwise stated. Year following address indicates date of election; year in parenthesis indicates date honorary member joined the Club.
Star preceding name indicates life member.)

HONORARY MEMBERS

Allen, Dr. J. A., Amer. Museum Nat. Hist., New York City. 1910.
Belding, Lyman, Stockton. 1896.
Henshaw, H. W., Biological Survey, Washington, D. C. 1909.
Merriam, Dr. C. Hart, 1919 16th St., Washington, D. C. 1909.
Nelson, E. W., Biological Survey, Washington, D. C. (1904) 1917.
Ridgway, Robert, 3306 New Hampshire Ave., N. W., Washington, D. C. 1905.
Stephens, Frank, 3746 Park Blvd., San Diego. (1894) 1912.

ACTIVE MEMBERS

Adams, Ernest, Carlotta, Humboldt Co. 1896.
Alexander, Annie M., 92 Seaview Ave., Piedmont. 1908.
Allen, Amelia S., 37 Mosswood Road, Berkeley. 1913.
Allen, Arthur A., McGraw Hall, Ithaca, N. Y. 1911.
Anderson, Ernest M., 2524 Asquith St., Victoria, B. C., Canada. 1915.
Anderson, Malcolm P., 2721 Buena Vista Ave., Alameda. 1901.
Anderson, Dr. Rudolph M., Zool. Div., Geological Survey, Ottawa, Ontario, Canada. 1916.
Andrews, Edna A., 2233 Ellsworth St., Berkeley. 1914.
Appleton, J. S., Simi, Ventura Co. 1901.
Armstrong, Edward E., 207 N. Michigan Ave., Chicago, Ill. 1914.
Arnold, E., Grand Trunk Ry., Montreal, Quebec, Canada. 1909.
Arnold, Dr. Ralph, 825 Union Oil Bldg., Los Angeles. 1893.
Arnold, Dr. W. W., 504 N. Nevada Ave., Colorado Springs, Colo. 1911.

- Atkinson, W. L., 35 Hawthorne Way, San Jose. 1901.
- Atsatt, Sarah R., 345 S. Serrano Ave., Los Angeles. 1911.
- Atterbury, Lydia, 2620 Le Conte Ave., Berkeley. 1915.
- Averill, E. F., Pendleton, Oregon. 1914.
- Badé, Wm. F., 2223 Atherton St., Berkeley. 1903.
- Badger, M. C., Santa Paula. 1915.
- Bagley, J., Box 46, Eureka. 1913.
- Bailey, Bernard, R. D. 1, Elk River, Minn. 1911.
- Bailey, Florence M., 1834 Kalorama Road, Washington, D. C. 1910.
- Bailey, H. H., 319 54th St., Newport News, Va. 1903.
- Bailey, Vernon, 1834 Kalorama Road, Washington, D. C. 1904.
- Bales, Dr. B. R., 151 W. Main St., Circleville, Ohio. 1906.
- Bangs, Outram, Museum Comp. Zool., Cambridge, Mass. 1906.
- Barker, Fred, Parkers Prairie, Minn. 1914.
- Barnes, Claude T., 359 10th Ave., Salt Lake City, Utah. 1915.
- Barnes, R. Magoon, Lacon, Ill. 1908.
- Barrows, Prof. Walter B., Box 183, East Lansing, Mich. 1909.
- Batchelder, Chas. F., 7 Kirkland St., Cambridge, Mass. 1910.
- Baynard, Oscar E., Clearwater, Fla. 1911.
- Beck, Rollo H., R. D. 21, San Jose. 1894.
- Bell, W. B., 1006 Rhode Island Ave. N. E., Washington, D. C. 1912.
- Bennett, R. H., Room 409, 444 Market St., San Francisco. 1909.
- Bent, A. C., Taunton, Mass. 1909.
- Bentley, Georgia, Lakeport, Lake Co. 1916.
- Benton, Ralph, 2074 W. 27th St., Los Angeles. 1915.
- Benton, Thomas H., Jr., 2821 Van Buren St., Alameda. 1916.
- Betts, Norman DeWitt, Linwood, Uintah Co., Utah. 1916.
- Bicknell, Mrs. F. T., 319 S. Normandie Ave., Los Angeles. 1913.
- Bigelow, Homer L., Old Orchard Road, Chestnut Hill, Mass. 1910.
- Bishop, Dr. Louis B., 365 Orange St., New Haven, Conn. 1904.
- Black, Chas. N., University Club, 54th St. and 5th Ave., New York City. 1916.
- Blain, Merrill W., 727 Jefferson Ave., Detroit, Mich. 1909.
- Blanchard, Augusta H., 246 Perry St., Oakland. 1916.
- Blayney, Nita A., 920 O St., Fresno. 1911.
- Bliss, John D., 1223 Ocean Ave., Santa Monica. 1916.
- Bliss, J. G., 2148 B Clinton Ave., Alameda. 1908.
- Boardman, Margaret S., 3022 Clay St., San Francisco. 1916.
- Boeck, Wm. C., East Hall, Univ. Cal., Berkeley. 1917.
- Boeing, W. E., 1100 Hoge Bldg., Seattle, Wash. 1914.
- Bohlman, Herman T., 202 Occident St., Portland, Ore. 1903.
- Bolander, L. P., Jr., 2517 21st Ave., Oakland. 1907.
- Bolt, Benj. F., 1421 Prospect Ave., Kansas City, Mo. 1916.
- Bowdish, B. S., Demarest, N. J. 1910.
- Bowditch, Charlotte, 2227 Upper Garden St., Santa Barbara. 1914.
- Bowles, J. H., The Woodstock, Tacoma, Wash. 1903.
- Boyle, Ashby D., 351 5th Ave., Salt Lake City, Utah. 1915.
- *Bradbury, W. C., 1440 Race St., Denver, Colo. 1913.
- Bradlee, Thomas H., San Ysidro Cottages, R. D. 1, Santa Barbara. 1916.
- Braislin, Dr. Wm. C., 425 Clinton Ave., Brooklyn, N. Y. 1910.
- Brandt, H. W., 2025 88th St., Cleveland, Ohio. 1914.
- Brewster, William, 145 Brattle St., Cambridge, Mass. 1904.
- Brooks, Major Allan, Okanagan Landing, B. C., Canada. 1906.
- Brooks, L., Box 539, New Bedford, Mass. 1913.
- Brouse, W. A., 3623 5th Ave., Los Angeles. 1916.
- Brown, D. E., 2542 Beacon Ave., Seattle, Wash. 1909.
- Brown, Edward J., 1609 S. Van Ness Ave., Los Angeles. 1915.
- Brown, Mrs. Herbert, 233 N. Court St., Tucson, Ariz. 1914.
- Brown, Wm. J., 250 Oliver Ave., Westmount, Quebec, Canada. 1911.
- Brown, W. W., Jr., Long Beach. 1909.
- Bryant, Amy M., 2533 Hill Court, Berkeley. 1914.
- Bryant, Dr. Harold C., Museum Vert. Zool., Berkeley. 1910.
- Burnett, W. L., State Agr. Coll., Fort Collins, Colo. 1910.
- Burnham, Dr. Clark, Bushnell Place, Berkeley. 1907.
- Burns, Frank L., Berwyn, Pa. 1909.
- Burtch, Verdi, Branchport, N. Y. 1910.
- Buturlin, Sergius A., Wessenberg, Esthonia, Russia. 1909.
- Caduc, Eugene E., 512 Massachusetts Ave., Boston, Mass. 1911.

- Calder, James A., Buena Park. 1917.
 Camp, Chas. L., Livingston Hall, Columbia University, New York City. 1909.
 Cantwell, George G., Puyallup, Wash. 1915.
 Carpenter, Nelson K., Box 127, Escondido. 1901.
 Carriger, H. W., 5185 Trask Ave., Oakland. 1895.
 Carriker, M. A., Jr., Cincinnati Coffee Co., Santa Marta, Colombia, S. A. 1911.
 Case, Rev. Bert F., Tolland, Conn. 1913.
 Case, C. M., 16 Burton St., Hartford, Conn. 1911.
 Chamberlain, C. W., 36 Lincoln St., Boston, Mass. 1912.
 Chamberlain, W. J., Corvallis, Oregon. 1907.
 Chambers, Fred W., 701 Walker Bank Bldg., Salt Lake City, Utah. 1915.
 Chambers, W. Lee, Eagle Rock. 1897.
 Chapman, Frank M., Amer. Museum Nat. Hist., New York City. 1903.
 Cheesman, M. R., R. D. 3, Box 61, Murry, Utah. 1915.
 *Childs, John Lewis, Floral Park, N. Y. 1904.
 Clark, Eugene P., 9 St. James Park, Los Angeles. 1915.
 Clark, Josiah H., 238 Broadway, Patterson, N. J. 1910.
 Clay, C. Irvin, Box 353, Eureka. 1910.
 Clifton, H. T., 509 E. Walnut St., Pasadena. 1904.
 Coale, Henry K., Highland Park, Ill. 1907.
 Coffin, Sherwood, 35 2nd St., San Francisco. 1911.
 Coggins, Herbert L., 2929 Piedmont Ave., Berkeley. 1910.
 Cohen, Donald A., 2618 Lincoln St., Alameda. 1901.
 *Colburn, A. E., 806 S. Broadway, Los Angeles. 1905.
 Conger, Dorothy, Recreation, Oregon. 1914.
 Cookman, Alfred, 1340 Exposition Blvd., Los Angeles. 1912.
 Cooper, Jas. S., 827 54th St., Oakland. 1903.
 Cox, H. E., Redondo Hardware Co., Redondo. 1916.
 Crane, Ada Ethel, R. D. 1, Box 229, Penryn. 1914.
 Crane, Alice F., 314 Cherry St., San Francisco. 1916.
 Craven, Jesse T., 811 Roosevelt Ave., Detroit, Mich. 1909.
 Crawford, Bertha E., Placerville, Eldorado Co. 1916.
 Crosby, Maunsell S., Grasmere Farms, Rhinebeck, N. Y. 1911.
 Culberson, Mrs. Victor, Fierro, New Mexico. 1917.
 Culver, Susan B., 2908 Channing Way, Berkeley. 1914.
 Cummings, Byron, Univ. Ariz., Tucson, Arizona. 1916.
 Currier, Ed. S., 416 E. Chicago St., St. Johns Station, Portland, Ore. 1904.
 Daggett, Frank S., Museum Hist., Sci., and Art, Los Angeles. 1895.
 Daniels, H. W., 312 Mountain Ave., Piedmont. 1916.
 Davenport, Elizabeth B., Northern Ave., Brattleboro, Vermont. 1911.
 Davidson, Cassie A., 1525 Le Roy Ave., Berkeley. 1915.
 Davidson, Pirie, 2420 College Ave., Berkeley. 1916.
 Davis, Benj. J., 2525 Piedmont Ave., Berkeley. 1916.
 Davis, Evan, 339 E. Palmyra Ave., Orange. 1894.
 Davis, Dr. Frank B., 401 Vernon St., Oakland. 1916.
 Davis, J. M., 811 O St., Eureka. 1908.
 *Dawson, W. Leon, R. D. 3, Box 83, Santa Barbara. 1906.
 Day, Chester S., 1711 Commonwealth Ave., Boston, Mass. 1910.
 Dean, W. F., Three Rivers. 1901.
 Deane, Ruthven, 112 W. Adams St., Chicago, Ill. 1904.
 Deane, Walter, 29 Brewster St., Cambridge, Mass. 1907.
 Dear, Lionell S., Box 456, Ft. William, Ontario, Canada. 1914.
 Dearborn, Ned, Linden, Maryland. 1909.
 Decker, F. R., Box 201, Prosser, Wash. 1913.
 DeGroat, Dudley S., R. D. 1, Box 215, San Diego. 1916.
 DeLange, Helen, La Jolla. 1917.
 Dice, Dr. Lee R., State Agr. Coll., Manhattan, Kas. 1914.
 Dickenson, A. B., 1319 Toberman St., Los Angeles. 1916.
 *Dickey, Donald R., San Rafael Heights, Pasadena. 1910.
 Dickey, Samuel S., 31 S. West St., Waynesburg, Pa. 1911.
 Dille, F. M., 2927 W. 28th Ave., Denver, Colo. 1903.
 Dixon, Joseph, Museum Vert. Zool., Berkeley. 1904.
 Dodge, Laura I., 3031 Elliot St., Long Beach. 1915.
 Dodge, Ralph E., 546 Bay St., Santa Cruz. 1915.
 Dolbear, Katherine E., Berkeley Inn, Berkeley. 1915.
 Drachman, Myra, 3031 Elliot St., Long Beach. 1915.

- DuBois, Alexander Dawes, Dutton, Montana. 1911.
- Dunbar, W. Linfred, Box 707, Stratford, Conn. 1911.
- Duprey, H. F., Dixon. 1907.
- Durfee, Owen, Box 125, Fall River, Mass. 1911.
- Dutcher, William, 949 Park Ave., Plainfield, N. J. 1905.
- Dwight, Dr. Jonathan, Jr., 134 W. 71st St., New York City. 1904.
- Earle, Eleanor P., Palma Sola, Manatee Co., Fla. 1911.
- Eastman, Capt. F. B., Fort Leavenworth, Kas. 1904.
- Eaton, S. Harrison, Malcolm Hotel, Lawrenceville, Ill. 1916.
- Edson, J. M., Marietta Road, Bellingham, Wash. 1911.
- Edwards, H. Arden, Box 312, Claremont. 1913.
- Eggleston, Prof. J. W., 239 Williams St., New London, Conn. 1913.
- Elliott, Mrs. Foster, 178 S. Serrano St., Los Angeles. 1917.
- Elliott, Roland, Grand Meadow, Minn. 1913.
- Emmons, R. A., Biological Survey, Washington, D. C. 1914.
- Enoch, Wade L., E. Bakersfield. 1915.
- Esterly, Dr. C. O., La Jolla. 1908.
- Everett, E. E., Ventura. 1913.
- Evermann, Dr. Barton W., Cal. Acad. Sciences, San Francisco. 1911.
- Falger, Mrs. William, Modesto. 1917.
- Fargo, Mrs. Minerva J., 1632 N. Kingsley Drive, Los Angeles. 1914.
- Fawcett, F. H., Narrows, Harney Co., Oregon. 1912.
- Felton, Mrs. C. N., R. D. 29, Los Gatos. 1916.
- Ferguson, Mary Van E., 5 Panoramic Way, Berkeley. 1915.
- Field, Mrs. Chas. A., 2547½ Piedmont Ave., Berkeley. 1916.
- Finley, Wm. L., 651 E. Madison St., Portland, Oregon. 1900.
- Fischer, E. J., 525 W. 57th St., Los Angeles. 1910.
- Fish, Frances Webster, 2325 Piedmont Ave., Berkeley. 1917.
- Fisher, Dr. A. K., Biological Survey, Washington, D. C. 1904.
- Fisher, Elizabeth W., 2222 Spruce St., Philadelphia, Pa. 1910.
- Fisher, Walter K., 1525 Waverly St., Palo Alto. 1900.
- Fitzpatrick, T. J., Bethany, Nebraska. 1913.
- Flanagan, John H., 89 Power St., Providence, R. I. 1904.
- Fleming, J. H., 267 Rusholme Road, Toronto, Ontario, Canada. 1910.
- Flint, Wm. R., 244 N. Madison Ave., Pasadena. 1912.
- Forbush, E. H., State House, Boston, Mass. 1916.
- Ford, Prof. W. A., Box 23, Umatilla, Oregon. 1915.
- Fordyce, Geo. L., 40 Lincoln Ave., Youngstown, Ohio. 1916.
- Forrest, E. R., 261 Locust Ave., Washington, Pa. 1910.
- Fortiner, J. C., Jr., Brawley. 1910.
- Fowler, Frederick H., 221 Kingsley Ave., Palo Alto. 1901.
- Frazier, J. F., Independence, Mo. 1911.
- Fuertes, Louis A., Cornell Heights, Ithaca, N. Y. 1904.
- Garlough, F. E., 577 Lexington Ave., Portland, Oregon. 1915.
- Gartrell, Geo. N., Summerland, B. C., Canada. 1917.
- Gault, Benj. T., Glen Ellyn, Ill. 1905.
- Gay, Harold S., 200 S. Wilson Ave., Alhambra. 1901.
- Gay, Sophie E., Red Bluff. 1916.
- Germain, Claire, 3906 W. First St., Los Angeles. 1915.
- Gibbons, Dr. Morton R., 3979 Washington St., San Francisco. 1916.
- Gifford, Dr. Harold, 420 S. 36th St., Omaha, Neb. 1916.
- Giles, Roscoe I., 82 Newton St., Marlborough, Mass. 1917.
- Gilkey, Helen, 2215 Ellsworth St., Berkeley. 1917.
- Gillette, Thurlow T., 982 Worcester St., Pasadena. 1915.
- Gilman, M. French, Banning. 1901.
- Goelitz, Walter A., 1622 Judson Ave., Ravinia, Ill. 1915.
- Goethe, C. M., Capital Natl. Bank Bldg., Sacramento. 1915.
- Goldman, E. A., Biological Survey, Washington, D. C. 1901.
- Goldman, Luther J., Pocatello, Idaho. 1902.
- Goodcell, Mrs. Marion L., 864 D St., San Bernardino. 1914.
- Goodwin, Rev. S. H., Box 284, Provo, Utah. 1910.
- Gould, Joseph E., Box 96, Arcadia, Fla. 1909.
- Grant, Mrs. Adele Lewis, Box 1124, Stanford University. 1915.
- Grant, U. S., 4th, 43 Westmoreley Court, Cambridge, Mass. 1909.
- Granville, Fred, 5717 Lexington St., Los Angeles. 1910.
- Grey, Henry, R. D. 2, Box 154 A, San Diego. 1901.
- Grinnell, Geo. Bird, 238 E. 15th St., New York City. 1914.

- Grinnell, Hilda Wood, 2811 College Ave., Berkeley. 1912.
- Grinnell, Dr. Joseph, Museum Vert. Zool., Berkeley. 1894.
- Gulon, Geo. Seth, Napoleonville, La. 1911.
- Gunn, Amy E., 972 Bush St., San Francisco. 1914.
- Hall, Carlotta C., 1615 La Loma Ave., Berkeley. 1915.
- Halladay, Daniel S., 729 Central Bldg., Los Angeles. 1910.
- Hanford, Forrest, 3825 Division St., Oakland. 1912.
- Hann, H. H., Parkdale, Oregon. 1909.
- Hanna, Wilson C., 1000 Pennsylvania Ave., Colton. 1902.
- Hannibal, Edna A., Stanford University. 1915.
- Hansen, Harold E., 870 43d Ave., San Francisco. 1916.
- Haring, Mrs. C. M., care Dr. C. M. Haring, Coll. Agr. Univ. Cal. Berkeley. 1915.
- Harmon, Mrs. Frances M., 2115 Estrella Ave., Los Angeles. 1912.
- Harris, Harry, Post Office, Kansas City, Mo. 1914.
- Hart, E. N., 940 Pacific Ave., Alameda. 1916.
- Hartman, Paul J., 1118½ Maple Ave., Los Angeles. 1917.
- Hathaway, Harry S., Box 1466, Providence, R. I. 1912.
- *Hazard, R. G., Peace Dale, R. I. 1909.
- Head, Anna, 2730 Belrose Ave., Berkeley. 1912.
- Hegner, Carl D., Box 312, Claremont. 1914.
- Heineman, Oluf J., 1664 Grove St., San Francisco. 1908.
- Heller, Edmund, Amer. Museum Nat. Hist., New York City. 1894.
- Helme, Arthur H., Miller Place, Suffolk Co., N. Y. 1911.
- Henderson, Junius, Box 398, Boulder, Colo. 1909.
- Henshaw, Judge F. W., Supreme Court, San Francisco. 1915.
- Hersey, F. Seymour, 6 Maple Ave., Taunton, Mass. 1915.
- Hersey, L. J., Wray, Colo. 1909.
- Hoag, Mrs. G. B., Waterman. 1916.
- Hodge, C. F., 125 Buffalo Ave., Takoma Park, D. C. 1914.
- Holland, Harold M., 320 S. Gramercy Place, Los Angeles. 1901.
- Holleman, Ridley, 215 Ogden St., San Antonio, Texas. 1917.
- Holman, F. C., 558 Lincoln Ave., Palo Alto. 1914.
- *Hoover, Theodore J., 450 Melville Ave., Palo Alto. 1898.
- Horsfall, R. Bruce, 1457 E. 18th St., Portland, Oregon. 1914.
- Horsfall, Mrs. R. Bruce, 1457 E. 18th St., Portland, Oregon. 1916.
- Howard, O. W., Box 484, Los Angeles. 1895.
- *Howell, A. B., Covina. 1908.
- Howell, Arthur H., 2919 S. Dakota Ave., Washington, D. C. 1916.
- Howell, B. F., Jr., 52 Patton Ave., Princeton, N. J. 1909.
- Howes, Paul G., 91 Hope St., Stamford, Conn. 1910.
- Howsley, L. B., Culver, Oregon. 1909.
- Hubbard, Samuel, Jr., 244 Montecito Ave., Oakland. 1912.
- Hubbs, Carl L., Field Museum Nat. Hist., Chicago, Ill. 1910.
- Huber, Wharton, Gwynedd Valley, Pa. 1915.
- Hudson, Lew Ward, 2804 Logan St., Selma. 1917.
- *Huey, Laurence, 1703 Clay Ave., San Diego. 1909.
- Hummell, A. A., State Normal School, Los Angeles. 1917.
- Hunt, E. B., 4318 14th St. N. W., Washington, D. C. 1914.
- Hunter, J. S., Union Hotel, San Mateo. 1903.
- Husher, Mrs. Gertrude H., 821 S. Hope St., Los Angeles. 1913.
- Hussey, Roland F., 1308 E. Ann St., Ann Arbor, Mich. 1916.
- Illingsworth, J. F., College of Hawaii, Honolulu, H. T. 1896.
- Ingersoll, A. M., 908 F St., San Diego. 1895.
- Irving, F. N., Southern Express Co., Columbia, S. C. 1910.
- Isham, C. Bradley, 27 W. 67th St., New York City. 1909.
- Jackson, Thos. H., 304 N. Franklin St., West Chester, Pa. 1911.
- Jacobs, J. Warren, 404 S. Washington St., Waynesburg, Pa. 1909.
- Jacobson, W. C., 2221 McKinley Ave., Berkeley. 1916.
- Jaeger, Edmund C., 1462 W. 6th St., Riverside. 1916.
- Jay, Antonin, 1622 Pennsylvania Ave., Los Angeles. 1901.
- Jenkins, Ida G., 30 Dearborn St., Roxbury, Mass. 1914.
- Jessee, Dr. R. L., Philo, Ill. 1909.
- Jesurun, Dr. Mortimer, 443 Emerson St., Palo Alto. 1916.
- Jewett, R. D., 1238 S. Serrano Ave., Los Angeles. 1912.
- Jewett, Stanley G., Pendleton, Oregon. 1909.
- Job, Herbert K., 291 Main St., West Haven, Conn. 1915.
- Johnson, Frank Edgar, 16 Amackassin Terrace, Yonkers, N. Y. 1911.

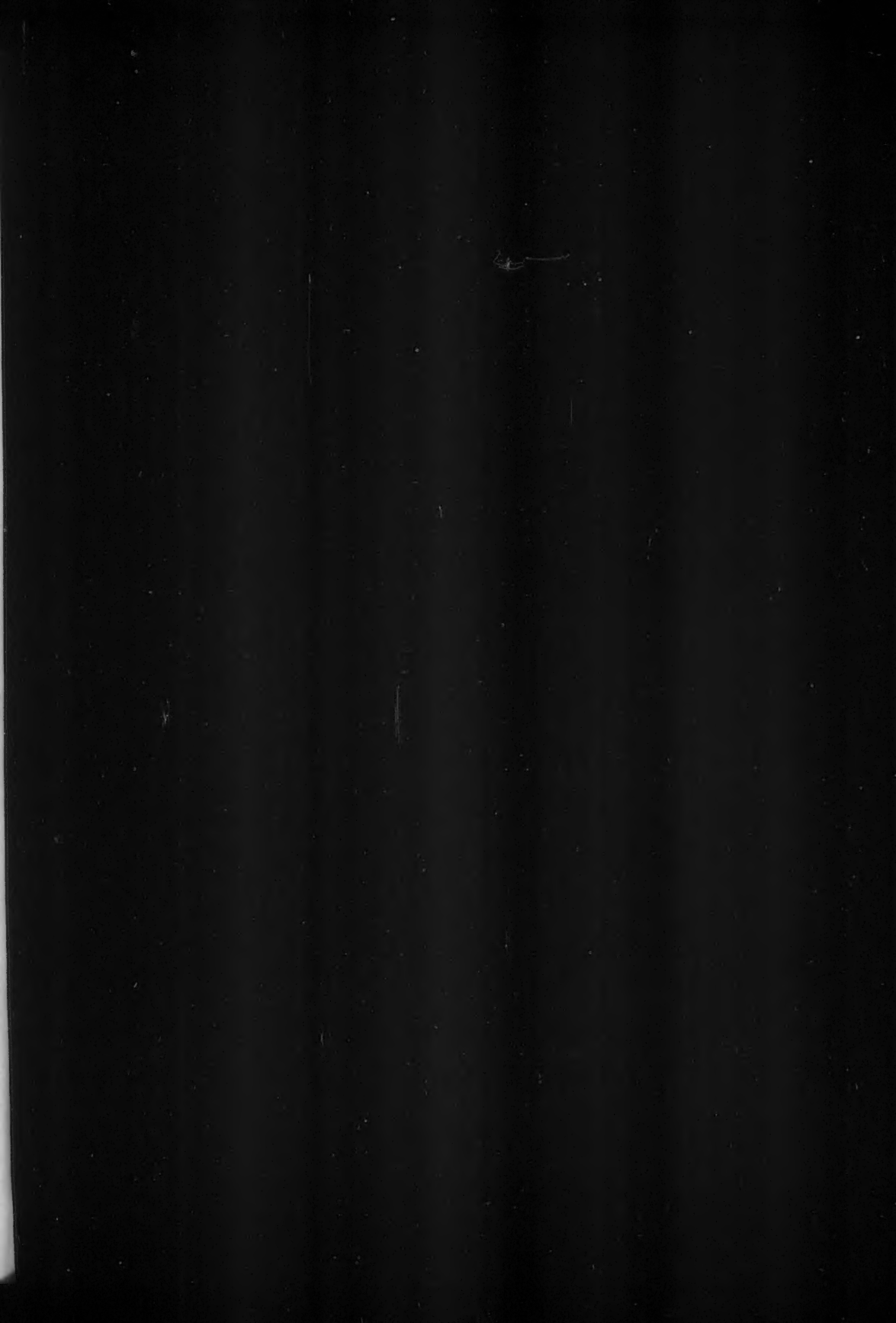
- Johnson, Dr. Myrtle E., National City. 1908.
 Jonas, Coloman, 1023 Broadway, Denver, Colo. 1910.
 Jones, Dr. Lynds, Museum Oberlin Coll., Oberlin, Ohio. 1911.
 Jordan, A. H. B., Everett, Wash. 1911.
 Jordan, Dr. David Starr, Stanford University. 1902.
 Judson, W. B., 826 Washington Bldg., Los Angeles. 1894.
 Julien, Lillian M., Yreka, Siskiyou Co. 1901.
 Kaeding, Geo. L., Battle Mountain, Nevada. 1903.
 Kelley, Harriet P., 929 Oxford St., Berkeley. 1917.
 Kellogg, Louise, Box 371, Suisun. 1911.
 Kellogg, Ralph T., Silver City, New Mexico. 1916.
 Kellogg, Prof. Vernon L., Stanford University. 1901.
 Kendall, J. N., Botanical Bldg., Univ. Cal., Berkeley. 1915.
 *Kennard, Frederic H., Dudley Road, Newton Centre, Mass. 1911.
 Kennedy, C. H., Cornell Univ., Ithaca, N. Y. 1912.
 Kermode, F., Provincial Museum, Victoria, B. C., Canada. 1911.
 Keyes, Prof. Chas. R., Mt. Vernon, Iowa. 1900.
 Kimball, H. H., Long Beach. 1909.
 King, Harold L., Box 92, Searchlight, Nevada. 1915.
 King, Hazel, 1898 Broadway, San Francisco. 1914.
 Kitchin, E. A., 4014 N. 35th St., Tacoma, Wash. 1917.
 Kittredge, Joseph, Jr., U. S. Forest Service, Missoula, Montana. 1915.
 Kluegel, Mrs. Edw. A., 2623 Le Conte Ave., Berkeley. 1916.
 Knappen, Nellie C., 2844 Webster St., Berkeley. 1916.
 Knickerbocker, Chas. K., 445 N. Sacramento Ave., Carpenter Sta., Chicago, Ill. 1905.
 Knowlton, Dr. F. H., U. S. Nat. Museum, Washington, D. C. 1910.
 Kofoid, Prof. C. A., Zool. Dept., Univ. Cal., Berkeley. 1909.
 Kohler, Louis S., 98 Watsessing Ave., Bloomfield, N. J. 1909.
 Kretzman, Prof. P. E., Concordia College, 1230 St. Anthony Ave., St. Paul, Minn. 1914.
 Kuser, John Dryden, Bernardsville, N. J. 1912.
 Kuykendall, W. A., Eugene, Lane Co., Oregon. 1916.
 Labarthe, Jules, Hobart Bldg., San Francisco. 1914.
 LaJeunesse, H. V., 1340 Broadway, Alameda. 1916.
 Lamb, Chester C., 946 S. Broadway, Los Angeles. 1899.
 Lancashire, Mrs. J. H., 1069 5th Ave., New York City. 1911.
 Lane, Geo. W., Morgan Hill. 1914.
 Lastreto, C. B., 260 California St., San Francisco. 1913.
 *Law, J. Eugene, 1834 El Cerrito Place, Hollywood. 1900.
 Law, Laura Beatty, 1834 El Cerrito Place, Hollywood. 1915.
 Layne, J. Gregg, 232 S. Spring St., Los Angeles. 1912.
 Lelande, H. J., Court House, Los Angeles. 1897.
 Leopold, Aldo, Gas & Electric Bldg., Albuquerque, New Mexico. 1916.
 Lewis, L. Alva, 809 Yeon Bldg., Portland, Ore. 1912.
 Libby, Gretchen L., 214 E. Victoria St., Santa Barbara. 1911.
 Ligon, J. Stokley, Box 131, Albuquerque, New Mexico. 1914.
 Lillencrantz, H. T., Rancho Las Cimas, Hollister. 1916.
 Lindsay, Dr. D. Moore, 808 Boston Bldg., Salt Lake City, Utah. 1915.
 Lings, G. H., 208 Piedmont Ave., Nyack, N. Y. 1913.
 Linton, C. B., 125 W. Ocean Ave., Long Beach. 1906.
 Litsey, John B., Jr., 1722 Alston Ave., Fort Worth, Texas. 1911.
 Little, Etta V., 413 E. Hadley St., Whittier. 1914.
 Little, Luther, Sierra Madre. 1914.
 Littlejohn, Chase, Redwood City. 1901.
 Loel, Mrs. Fred J., 17 S. 1st St., San Jose. 1917.
 Lombardi, Ethel, 2331 Le Conte Ave., Berkeley. 1916.
 Loomis, Leverett M., Cal. Acad. Sciences, San Francisco. 1902.
 Loring, J. Alden, Owego, Tioga Co., N. Y. 1914.
 Love, Chas. A., 3353 22nd St., San Francisco. 1901.
 Love, Guy, R. D. 5, Oberlin, Kansas. 1913.
 Lueddemann, Frieda, Box 105, Los Gatos. 1914.
 Lund, Henry J., 526 Spencer Ave., San Jose. 1916.
 Lusk, Richard D., Winkelman, Arizona. 1915.
 Luther, Clarence H., 8 McIlroy Bldg., Fayetteville, Ark. 1909.

- Magee, William A., Jr., R. D. Fruitvale, Box 433, Oakland. 1912.
- Mailliard, Ernest C., 1815 Vallejo St., San Francisco. 1909.
- Mailliard, John W., 230 California St., San Francisco. 1894.
- Mailliard, Joseph, 230 California St., San Francisco. 1895.
- Marshall, Dr. Benj. M., 2036 D St., Eureka. 1913.
- Marshall, T. K., 85 Rincon Road, Tucson, Arizona. 1916.
- Martin, De Loach, 1223 S. Washington Ave., Marshall, Texas. 1916.
- Martin, John W., 339 N. 1st St., San Jose. 1907.
- Massey, Herbert, Ivy Lea, Burnage, Didsbury, Manchester, England. 1909.
- McAtee, W. L., Biological Survey, Washington, D. C. 1907.
- *McGregor, R. C., Bureau of Science, Manila, P. I. 1893.
- McLain, R. B., Market & 12th St., Wheeling, W. Va. 1897.
- McLean, Donald D., Coulterville. 1916.
- Meade, Grace S., 202 E. 12th St., Oakland. 1916.
- Meeker, Jesse C. A., Box 161, Danbury, Conn. 1907.
- Meister, H. D., Wauseon, Ohio. 1909.
- Mershon, W. B., Saginaw, Mich. 1911.
- Meyer, Heloise, Overlee, Lenox, Mass. 1914.
- Michael, Chas. W., 83 Sharon St., San Francisco. 1916.
- Miller, Mrs. E. C. T., 1010 Euclid Ave., Cleveland, Ohio. 1914.
- Miller, George V., 848 Gough St., San Francisco. 1915.
- Miller, Dr. Loye Holmes, State Normal School, Los Angeles. 1905.
- Miller, Mrs. Olive Thorne, 5928 Hayes Ave., Los Angeles. 1911.
- Miller, W. De Witt, Amer. Museum Nat. Hist., New York City. 1909.
- Mills, Enos A., Longs Peak, Estes Park, Colo. 1914.
- Miner, Dr. H. N., Colfax, Yolo Co. 1903.
- Mitchell, H. H., Dept. Agr., Prov. Museum, Regina, Saskatchewan, Canada. 1915.
- Mitchell, Dr. Walton I., 603 Beacon Bldg., Wichita, Kansas. 1909.
- Moffett, James, 1813 Broadway, San Francisco. 1917.
- Moles, S. D., 157 W. 7th St., Claremont. 1915.
- Moore, Chas. S., Box 222, San Diego. 1913.
- Moore, Nellie, 122 Falcon Ave., Long Beach. 1915.
- Moore, Robert T., 46 Mansion Ave., Haddonfield, N. J. 1911.
- Moran, R. B., 220 S. Wilton Place, Los Angeles. 1897.
- *Morcom, G. Frean, Box 175, Huntington Beach. 1904.
- More, R. L., Vernon, Texas. 1911.
- Morgan, Mattie Beth, 2931 Travis Ave., Ft. Worth, Texas. 1916.
- Morley, S. Griswold, 2535 Etna St., Berkeley. 1916.
- Mueller, Carl, Marysville. 1911.
- Mullen, James L., 1519 S. 2nd St. E., Salt Lake City, Utah. 1915.
- Munro, J. A., Okanagan Landing, B. C., Canada. 1914.
- Murie, O. J., 219 7th Ave. S., Moorhead, Minn. 1913.
- Myers, Mrs. H. W., 311 N. Ave. 66, Los Angeles. 1912.
- Nevin, W. H., Pasadena. 1915.
- Newhall, Mrs. Chas. S., 2629 Piedmont Ave., Berkeley. 1916.
- Nichols, J. T., Amer. Museum Nat. Hist., New York City. 1909.
- Nicholson, Donald J., Orlando, Fla. 1911.
- Noack, H. R., 309 Perry St., Oakland. 1901.
- Nokes, Dr. Irwin D., 820 Marsh-Strong Bldg., Los Angeles. 1914.
- Norris, Joseph Parker, Jr., 2122 Pine St., Philadelphia, Pa. 1911.
- Norris, Roy, 725 N. 10th St., Richmond, Indiana. 1911.
- Oberholser, Dr. Harry C., 1444 Fairmont St. N. W., Washington, D. C. 1904.
- O'Farrell, Mabel E., 2403 F St., San Diego. 1917.
- Ohl, H. C., McKittrick. 1913.
- Ohlendorf, W. C., 1924 Blue Island Ave., Chicago, Ill. 1910.
- Osencup, Claten, 2029 N. Fair Oaks Ave., Pasadena. 1917.
- Osgood, Wilfred H., Field Museum Nat. Hist., Chicago, Ill. 1893.
- Osterhaut, Geo. E., Windsor, Colo. 1915.
- Overington, R. Bruce, 120 W. Lancaster Ave., Wayne, Pa. 1915.
- Owen, Virgil W., Light, Cochise Co., Ariz. 1896.
- Palmer, Elizabeth Day, 1741 Harvard Blvd., Los Angeles. 1909.
- Palmer, R. H., Peoples Store Bldg., Pocatello, Idaho. 1915.
- Palmer, Dr. T. S., 1939 Biltmore St. N. W., Washington, D. C. 1903.
- Parker, Herbert, South Lancaster, Mass. 1911.
- Parmenter, Henry E., Gregson Hotel, Santa Barbara. 1916.
- Parsons, Mrs. Marion Randall, Mosswood Road, Berkeley. 1917.

- Paschal, Robert L., Fort Worth High School, Fort Worth, Texas. 1916.
- Paul, J. H., 1320 E. 2d St. S., Salt Lake City, Utah. 1915.
- Paul, Lucius H., 19 Aurora St., Rochester, N. Y. 1911.
- Peabody, Rev. P. B., St. James Rectory, Independence, Iowa. 1904.
- Pearson, T. Gilbert, 2257 Loving Place, New York City. 1910.
- Péck, Morton E., 244 N. 12th St., Salem, Oregon. 1909.
- Pemberton, J. R., 1011 N. Main St., Tulsa, Okla. 1900.
- Peyton, Lawrence, Sespe, Ventura Co. 1909.
- Peyton, Sidney B., Sespe, Ventura Co. 1913.
- Phelps, Frank M., 212 E. 4th St., Elyria, Ohio. 1912.
- Philipp, Philip Bernard, 220 Broadway, New York City. 1911.
- Phillips, Chas. L., 5 W. Weir St., Taunton, Mass. 1915.
- Phillips, Don C., 49 N. Main St., Napa. 1912.
- Phillips, John C., Knobfields, Wenham, Mass. 1911.
- Pierce, Wright M., Box 116, Claremont. 1902.
- Pierpont, Philip, Nordhoff. 1913.
- Pilsbury, Frank O., 90 Main St., Walpole, Mass. 1911.
- Pleasants, Mrs. J. E., R. D. 3, Orange. 1900.
- Polkinghorn, George, 2651 Kenwood Ave., Los Angeles. 1915.
- Powell, Helen, 2703 Dwight Way, Berkeley. 1914.
- Pratt, Alice Edwards, R. D. 4, Box 226 K, San Diego. 1917.
- Pratt, Anna B., Fallbrook, San Diego Co. 1916.
- Price, A. E., Grant Park, Ill. 1905.
- Price, Elizabeth H., 23 Panoramie Way, Berkeley. 1917.
- Pringle, Cornelia C., Cupertino, Santa Clara Co. 1915.
- Purinton, Mrs. C. A., 2223½ Chapel St., Berkeley. 1915.
- Randolph, Flora A., 2962 Derby St., Berkeley. 1907.
- Rankin, Edward P., 5346 Aldama St., Los Angeles. 1913.
- Rathbun, S. F., 217 14th Ave., Seattle, Wash. 1904.
- Ray, Milton S., 220 Market St., San Francisco. 1899.
- Redington, Robert R., 234 Dupont Bldg., Wilmington, Del. 1917.
- Reis, C. Oscar, 646 Juanita Ave., Los Angeles. 1917.
- Reynolds, L. R., 2967 Pacific Ave., San Francisco. 1913.
- Rich, Dr. Guy C., 1820 El Cerrito Place, Hollywood. 1911.
- Richards, E. B., 128 Chester St., Grass Valley. 1909.
- Richards, Dr. T. W., Bureau Med. & Surg., Navy Dept., Washington, D. C. 1908.
- Richards, W. W., 1512 Broadway, Oakland. 1915.
- Richey, J. Howard, 277 W. Dakota St., Pasadena. 1914.
- Richmond, Dr. Chas. W., U. S. Nat. Museum, Washington, D. C. 1904.
- Richmond, Watts L., Batavia, N. Y. 1915.
- Riley, J. H., U. S. Nat. Museum, Washington, D. C. 1909.
- Rittenhouse, Prof. Samuel, Univ. S. Cal., Los Angeles. 1916.
- Ritter, Prof. W. E., La Jolla. 1901.
- Roberts, Dr. T. S., Zool. Museum, Univ. Minn., Minneapolis, Minn. 1909.
- Robertson, Howard, Hosfield Bldg., Los Angeles. 1896.
- Robertson, John McB., R. D. 1, Box 13, Buena Park, Orange Co. 1913.
- Robinson, Webster, 5882 Towne Ave., Los Angeles. 1916.
- Rossignol, Gilbert R., Jr., 2116 Bull St., Savannah, Ga. 1909.
- Rowley, J., 42 Plaza Drive, Berkeley. 1909.
- Rust, Henry J., Box 683, Coeur d'Alene, Idaho. 1911.
- Sabin, Eugene P., 1334 Gardner St., Hollywood. 1915.
- Sabin, Nat T., 1639 Martel Ave., Hollywood. 1915.
- Sage, John H., Portland, Conn. 1910.
- Sampson, Walter B., 1005 N. San Joaquin St., Stockton. 1894.
- Sanford, Dr. Leonard C., 347 Temple St., New Haven, Conn. 1915.
- Sanford, W. H., 17 W. Magnolia St., Stockton. 1915.
- Saunders, Aretas A., 143 East Ave., Norwalk, Conn. 1909.
- Saunders, W. E., London, Ontario, Canada. 1910.
- Schaefer, Oscar F., U. S. Forest Service, Flagstaff, Arizona. 1917.
- Schafer, J. J., R. D. 1, Port Byron, Ill. 1916.
- Schlisinger, Mrs. Jane L., 1417 Filbert St., Oakland. 1915.
- Schneider, J. J., Box 363, Anaheim. 1899.
- Schussler, Geo. W., 1345 Oak St., San Francisco. 1911.
- Sclater, William Lutley, 10 Sloane Court, London, S. W., England. 1909.
- Scott, Carroll DeW., 4146 Jackdaw St., San Diego. 1915.
- Shafer, Frederick P., U. S. S. Albatross, San Diego. 1917.

- Shannon, Wm. Purdy, Room 803, 1170 Broadway, New York City. 1914.
- Sharp, Clarence S., Escondido. 1902.
- Sharples, Robert P., West Chester, Pa. 1911.
- Shaw, W. T., 902 Campus Ave., Pullman, Wash. 1911.
- Shelton, Alfred C., Univ. Ore., Eugene, Oregon. 1909.
- Shepardson, D. I., 2841 Rimpau Ave., Los Angeles. 1909.
- *Sherman, Althea R., National, via McGregor, Iowa. 1911.
- Shiras, George, 3rd, Stoneleigh Court, Washington, D. C. 1914.
- Silliman, O. P., 220 Salinas St., Salinas. 1913.
- Simmons, George F., 701 Holman Ave., Houston, Texas. 1913.
- Skinner, E. H., R. D. 21, Regnart Road, Cupertino, Santa Clara Co. 1900.
- Skinner, M. P., Summerville, S. C. 1915.
- Sloanaker, Jos L., Kalispell, Montana. 1910.
- Smith, Allyn G., 2266 W. 21st St., Los Angeles. 1909.
- Smith, Austin Paul, High Island, Texas. 1907.
- Smith, C. R., 563 42nd Ave., San Francisco. 1917.
- Smith, Prof. Frank, 913 W. California Ave., Urbana, Ill. 1911.
- Smith, Franklin J., Box 98, Eureka. 1913.
- Smith, Horace G., 2918 Lafayette St., Denver, Colo. 1914.
- Smith, Lance H., 1710 Waverly St., Palo Alto. 1915.
- Smith, Wilfred, 1125 5th St., Santa Monica. 1911.
- Snyder, Prof. J. O., Box 775, Stanford University. 1900.
- Spaulding, E. S., 1408 Chapala St., Santa Barbara. 1910.
- Spielman, Oscar P., 1440 Warner Ave., Chicago, Ill. 1909.
- Sprunger, H. C., Wickenburg, Arizona. 1915.
- Squires, Rev. W. A., 3852 23rd St., San Francisco. 1912.
- Stafford, Walter A., 31 Park Way, Piedmont. 1917.
- Stansell, Sidney S. S., Manly, Alberta, Canada. 1915.
- Stark, Dr. W., Auburn, Placer Co. 1915.
- Steinbeck, William, 1029 N. Hunter St., Stockton. 1897.
- Steinmetz, Frank J., 1021 Ramona St., Palo Alto. 1917.
- Stephens, T. C., Morningside College, Sioux City, Iowa. 1914.
- Stevens, Dr. J. F., 1920 E St., Lincoln, Nebraska. 1911.
- Stivers, Dr. C. G., 502 Auditorium Bldg., Los Angeles. 1914.
- Stoddard, H. L., Field Museum Nat. Hist., Chicago, Ill. 1914.
- Stone, D. D., R. D. 4, Oswego, N. Y. 1909.
- Stone, Geo. E., 1725 Le Roy Ave., Berkeley. 1912.
- Storer, Mary S., 467 San Pablo Ave., Fresno. 1914.
- Storer, Tracy I., Museum Vert. Zool., Berkeley. 1910.
- Strong, William A., 41 Grand Ave., San Jose. 1912.
- Stuart, Geo. H., 3rd, N. W. cor. Broad & Chestnut Sts., Philadelphia, Pa. 1913.
- Sugden, J. W., 55 S. 8th W. St., Salt Lake City, Utah. 1915.
- Sukesdorf, P. J., Bingen, Utah. 1910.
- Swales, Bradshaw H., Grosse Isle, Michigan. 1906.
- Swarth, Harry S., Museum Vert. Zool., Berkeley. 1897.
- Sweeney, Joseph A., U. S. Forest Service, Halsey, Nebraska. 1912.
- Swenk, Prof. Myron Harmon, 3028 Starr St., Lincoln, Nebraska. 1916.
- Swezy, Dr. Olive, Zool. Dept., Univ. Cal., Berkeley. 1914.
- Swift, Faith A., State Normal School, Los Angeles. 1916.
- Sykes, Geo. F., 322 Agr. Hall, Corvallis, Oregon. 1913.
- Tallman, George, 2127 Court St., Los Angeles. 1915.
- Tarbell, Olga S., 1 Cabrillo Place, Pasadena. 1906.
- Taverner, P. A., Zool. Div., Geological Survey, Ottawa, Ontario, Canada. 1909.
- Taylor, E. F., Grass Valley, Nevada Co. 1910.
- Taylor, Loren E., R. D. 2, Reno, Nevada. 1897.
- Taylor, Dr. Walter P., Biological Survey, Washington, D. C. 1905.
- Telford, Harry, Klamath Falls, Oregon. 1912.
- Terrill, L. McL., 44 Stanley Ave., St. Lambert, Quebec, Canada. 1911.
- Test, Louis A., Ames, Iowa. 1908.
- *Thayer, John E., Box 98, Lancaster, Mass. 1906.
- Thomas, C. A., 120 Broad St., Kennett Square, Pa. 1917.
- Thompson, J. Alden, Bend, Oregon. 1917.
- Thornber, Mrs. Harriet B., Univ. Ariz., Tucson, Arizona. 1914.
- Todd, W. E. Clyde, Carnegie Museum, Pittsburgh, Pa. 1909.
- Tope, L. A., Clearfield, Iowa. 1915.

- Treganza, A. O., 610 Utah Svgs. & Trust Bldg., Salt Lake City, Utah. 1907.
- Treganza, Mrs. A. O., Lemon Grove. 1915.
- Tremper, Lauren, 136 Dewey St., Philadelphia, Pa. 1911.
- Trenor, Thomas, 1501 Scott St., San Francisco. 1913.
- Trescot, E. B., Cotati, Sonoma Co. 1915.
- Tripe, Thomas M., Howardsville, Colo. 1911.
- Trowbridge, Chas. O., Box 42, Stat. A., Framingham Center, Mass. 1915.
- Trumbull, J. H., 39 Farmington Ave., Plainville, Conn. 1911.
- Tufts, Robie W., Wolfville, Nova Scotia. 1917.
- Tyler, John G., 149 Blackstone Ave., Fresno. 1905.
- Tyler, Dr. Winsor M., 522 Massachusetts Ave., Lexington, Mass. 1914.
- Ufford, Elmer, Oberlin, Kansas. 1917.
- Unglish, W. E., Box 233, Gilroy. 1910.
- Van Denburgh, John, 240 Stockton St., San Francisco. 1916.
- Van Fleet, Clark C., Box 468, Santa Rosa. 1906.
- Van Rossem, Adriaan, 2751 Sunset Blvd., Los Angeles. 1909.
- Vilas, A. H., Bracket Apts., Santa Barbara. 1916.
- Vorhies, Chas. T., Univ. Ariz., Tucson, Arizona. 1916.
- Wakeley, Katherine S., 810 S. Burlington Ave., Los Angeles. 1915.
- Walker, Alex., Tillamook, Oregon. 1911.
- Walker, Ernest P., Alaska Fisheries Co., Wrangell, Alaska. 1910.
- Walker, Dr. R. L., 355 Main Ave., Carnegie, Pa. 1914.
- Wall, Edward, Box 554, San Bernardino. 1913.
- Warburton, Stanton, Jr., 1221 N. Fife St., Tacoma, Wash. 1917.
- Ward, Emma W., 1539 Versailles Ave., Alameda. 1917.
- Ward, F. H., 18 Grove Place, Rochester, N. Y. 1915.
- Warren, E. R., 20 W. Caramillo St., Colorado Springs, Colo. 1909.
- Wear, Winifred N., 253 Coast Ave., Fresno. 1909.
- Webb, Joseph J., 519 California St., San Francisco. 1916.
- Weber, H. B., Blackfoot, Idaho. 1910.
- Weber, J. A., Box 327, Palisades Park, N. J. 1915.
- Weed, Benj., 822 Clayton St., San Francisco. 1911.
- Welch, L. W., 1845 Olive St., Long Beach. 1911.
- Wells, Gurnie, Pac. T. & T. Co., Cisco, Placer Co. 1911.
- Westerfeld, Dr. Otto, 240 Stockton St., San Francisco. 1915.
- Wetmore, Alex., Biological Survey, Washington, D. C. 1909.
- Wheeler, Mrs. J. W., R. D. 1, Tucson, Arizona. 1912.
- Wheeler, Roswell S., 599 Scenic Ave., Piedmont Sta., Oakland. 1894.
- Wheelock, Mrs. H. B., 1040 Hinman Ave., Evanston, Ill. 1909.
- White, E. A., R. D. 1, Box 131, Santa Paula. 1915.
- White, Halstead G., Claremont. 1914.
- Widmann, Otto, 5105 Von Versen Ave., St. Louis, Missouri. 1904.
- Wiggins, Dr. C. G., 1191 N. 9th St., Colton. 1916.
- Wilder, H. E., Carlotta, Humboldt Co. 1909.
- Wiley, Leo, Palo Verde. 1916.
- Willard, B. G., 1619 Massachusetts Ave., Cambridge, Mass. 1910.
- Willard, F. C., Farmingdale, Long Island, N. Y. 1905.
- Willett, Geo., 2123 Court St., Los Angeles. 1905.
- Williams, Robert W., Tallahassee, Fla. 1914.
- Wood, Dr. Casey A., Chicago Svgs. Bank Bldg., Chicago, Ill. 1916.
- Wood, George, 7403 Hawthorne Ave., Hollywood. 1912.
- Wood, Jesse J., 309 W. Micheltoreno St., Santa Barbara. 1912.
- Wood, Norman A., Museum Zool., Ann Arbor, Mich. 1916.
- Woodruff, Frank M., Chicago Acad. Sciences, Chicago, Ill. 1906.
- Wrathall, F. A., 315 S. W. Temple St., Salt Lake City, Utah. 1915.
- Wright, Curtis, Jr., 6436 Benvenue Ave., Berkeley. 1916.
- Wright, Frank S., 14 Cayuga St., Auburn, N. Y. 1910.
- Wright, Horace W., 107 Pinckney St., Boston, Mass. 1914.
- Wueste, Rudolph, Lower Otay Dam, Bonita. 1901.
- Wyman, L. E., 3927 Wisconsin St., Los Angeles. 1908.
- Wythe, Margaret W., 4247 Terrace St., Oakland. 1912.
- Young, John P., 1510 5th Ave., Youngston, Ohio. 1914.
- Zahn, Otto J., 2115 Estrella Ave., Los Angeles. 1896.
- Zech, Lillian, 119 Magnolia Ave., Long Beach. 1916.



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